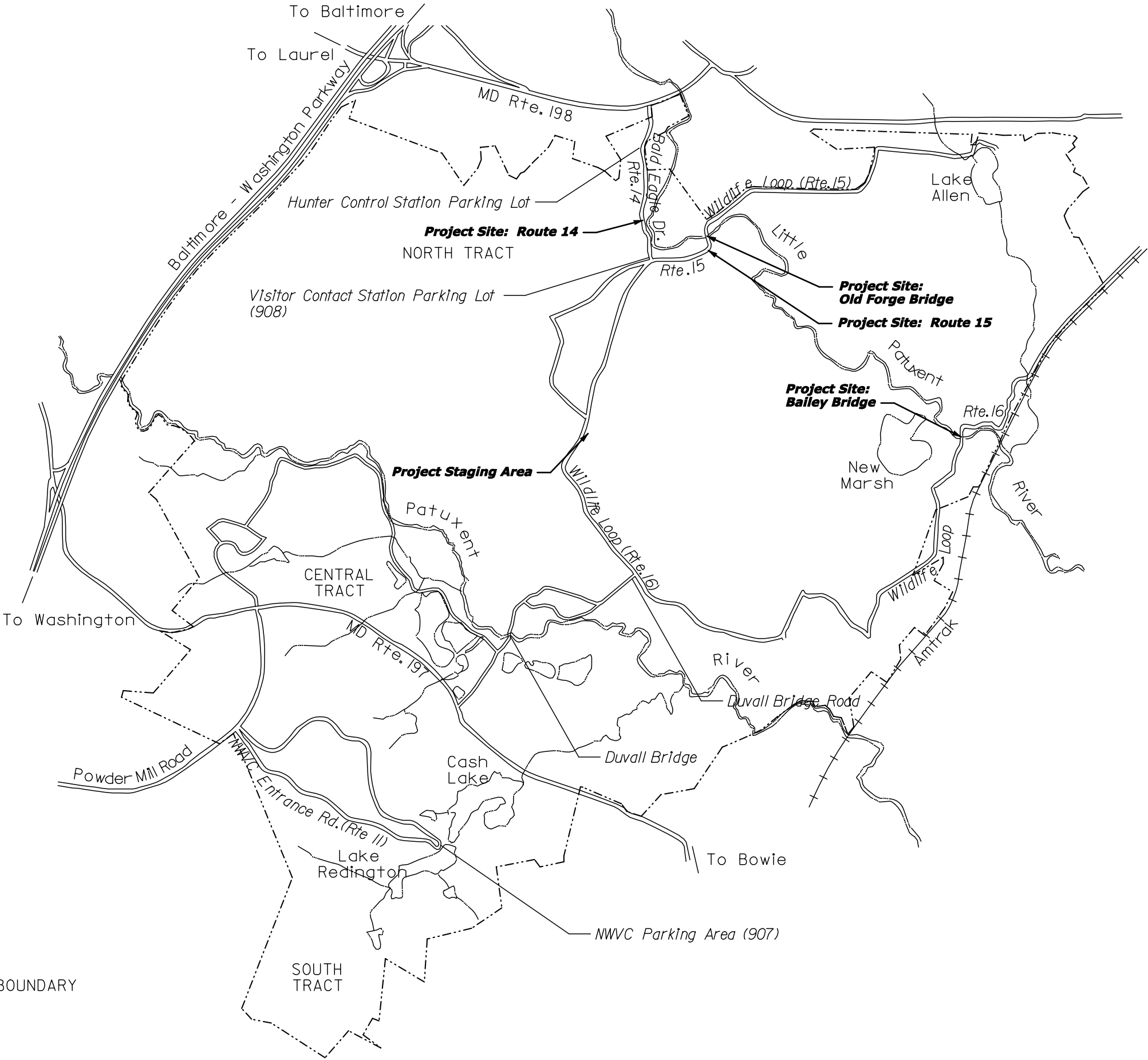
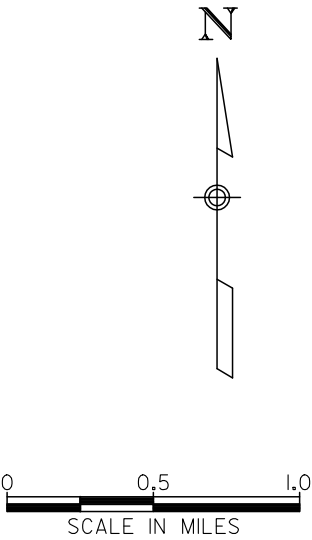


REG	STATE	PROJECT	SHEET NO.
NE	MD	ERFO-PRR 14(1), 16(1)	A2



- Notes:**
1. See SCR subsection 107.08 regarding UXO construction support
 2. Setup staging area as approved by the CO and MDE inspector. Place silt fence along the lowest side of the staging area with sides turned up 5'



KEY

- REFUGE BOUNDARY
- ===== ROADWAY

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION
STERLING, VIRGINIA

PATUXENT RESEARCH REFUGE

LOCATION MAP

ms:\proj\ecds\ref\ug\m\q\pr\4\1\J61\j\croj_dev\cadd\A403-pr\14\16\11_spl\adgn 9/18/04 AM 7/11/2008

Abutment	Abut.	Mainline	M.L.
Aggregate	aggr.	Material	matl.
Ahead	AH	Maximum	max.
Alternate	alt.	Mile[Kilometer] post	M.P[K.P.]
Average daily traffic	ADT	Minimum	min.
Back	BK	Monument	mon.
Balance point	BP	Mechanically stabilized embankment	MSE
Bearing	brg.		
Beginning	beg.	Original ground	OG
Bench mark	BM	Out to out	o. to o.
Centerline		Outside diameter	OD
Center to center	cc, c-c or c. to c.	On centers	o. c.
Centers		Normal crown	NC or NCR
Clear	clr.	North	N
Column	col.	Pavement	pvmt.
Connection	conn.	Plate	pl.
Construction joint	Constr. jt.	Point of compound curve	PCC
Continuous	cont.	Point of curve	PC
Corrugated metal pipe	CMP	Point of curve to spiral	PCS or CS
Culvert	culv.	Point of Intersection	PI
Curve central angle (spiral curve transitions)	Δ_c	Point of spiral to curve	PSC or SC
Curve total angle (curve delta or deflection)	Δ	Point of spiral to reverse spiral	SRS
Design hourly volume	DHV	Point of spiral to tangent	PST or ST
Design speed	V	Point of tangent	PT
Diagonal	diag.	Point of tangent to spiral	PS or TS
Diameter	D, dia., or	Point on curve	POC
Diaphragm	diaph.	Point on spiral	POS
Distance	dst.	Point on tangent	POT
Drawing(s)	dwg(s), or drwg(s)	Radius	R
Drop Inlet	DI	Range	R.
East	E	Reinforcement (reinforced)	reinf.
Edge of pavement	EP or EOP	Required	reqd.
Elevation	elev.	Right	Rt., rt. or RT
Elevation with number	El. 94.161	Right-of-way	R/W
Embankment	emb.	Roadway	Rdwy.
End section	ES	Route	Rte.
Equation	EQ or eq.	Section	Sec.
Excavation	exc.	South	S
Expansion joint	exp. jt.	Spacing, spaces or spaced	spa.
Finish	fin.	Spiral central angle	s
Flange	flg.	Standard	std.
Footing	ftg.	Station	Sta.
Galvanized	galv.	Stiffener	stiff.
Gage(gauge)	ga.	Stringer	stgr.
Headwall	hdwl.	Structure	struc.
Hexagon	hex.	Superelevation rate	e
High water	HW	Symmetrical	sym.
Inside diameter	ID	Tangent distance	T
Joint	jt.	(tangent length)	
Lamination	lam.	Tangent distance	Ts
Latitude	lat.	(spiral curve transision)	
Left	lt., Lt. or LT	Temporary benchmark	TBM
Length of curve(simple curve)	L	Temporary construction easement	TCE
Length of curve (spiral curve transision)	Lc	Thread	thd.
Length of spiral	Ls	Township	T.
Longitudinal(longitude)	long.	Typical	typ.
Low water	LW	Vehicle per hour	vph
		Vertical point of intersection	VPI
		West	W

NATIONAL BOUNDARY	-----
STATE BOUNDARY	-----
COUNTY BOUNDARY	-----
CITY BOUNDARY	-----
TOWNSHIP or RANGE LINE	-----
SECTION LINE	-----
1/4 SECTION LINE	-----
1/16 SECTION LINE	-----
NATIONAL PARK or FOREST BOUNDARY	////////
PROPERTY LINE	-----
TRAVERSE POINT (Horizontal & Vertical) Top of Triangle Points North	T-45 2,645.9
TRAVERSE POINT (Horizontal)	T-3
BRASS CAP	▲
STEEL PIN	●
HUB & TACK	○
SPOT ELEVATION	x 99.9
COORDINATE GRID TICK	+

RIGHT-OF-WAY LINE	EXISTING R/W	PROPOSED R/W
RIGHT-OF-WAY LINE with MONUMENT	○ R/W	● R/W
SECTION CORNER	FOUND 36 31 1 6 15 22	PROJECTED 36 31 1 6 15 22
1/4 SECTION CORNER	●	○
1/16 SECTION	●	No Symbol
PROPERTY CORNER	●	No Symbol
PARCEL NUMBER	No Symbol	400
EASEMENT (Permanent - Construction)	P/E	C/E
ROUTE NUMBERS	INTERSTATE 26	U.S. 25 STATE 694
SLOPE STAKE	TOP OF CUT TOE OF FILL TRANSITION	
ROADWAY, EXISTING		
RAILROAD	SINGLE TRACK	MULTIPLE TRACK
TRAIL		
INTERMITTENT DRAINAGE/ SMALL CREEK		
SPRING		
LARGE CREEK/RIVER		
LAKE, POND or RESERVOIR; MARSHLAND		
PAVEMENT REMOVAL/ROADWAY OBLITERATION		AREA PATTERN
FULL DEPTH PAVEMENT		
SIDEWALK ASPHALT/CONCRETE		
MILL AND OVERLAY		
OVERLAY		
SILT FENCE		SF
DIVERSION BERM		DB
DIVERSION CHANNEL		
CHECK DAM		
RIPRAP/CULVERT RIPRAP		
BORING LOCATION		B-1
TEST PIT		TP-1
NORTH ARROW		N
MATERIAL SOURCE		

	REG	STATE	PROJECT	SHEET NO.
	NE	MD	ERFO-PRR 14(1), 16(1)	A3
FENCE	EXISTING X	PROPOSED XX		
GATE with FENCE	X X	XX XX		
CATTLEGUARD	XXXX	XXXX		
GUARDRAIL	□ □ □ □	□ □ □ □		
MEDIAN & SIDE (CONCRETE) BARRIER	□ □ □ □	□ □ □ □		
SIGNS	POST MOUNTED PORTABLE			
RETAINING WALL	No Symbol	TT		
OVERHEAD(POWER POLE) UTILITIES	--- P ---	--- P ---		
UNDERGROUND UTILITIES	--- W ---	--- W ---		
BRIDGE	--- W ---	--- W ---		
PIPE CULVERT (arrow shows flow)	--- W ---	--- W ---		
PIPE CULVERT with END SECTION	--- W ---	--- W ---		
PIPE CULVERT with HEADWALL	--- W ---	--- W ---		
CULVERT with DROP INLET	--- W ---	--- W ---		
BOX CULVERT	--- W ---	--- W ---		
UNDERDRAIN	--- W ---	--- W ---		
BUILDING	--- W ---	--- W ---		
TREELINE; TREE	--- W ---	--- W ---		
PROJECT SPECIFIC SYMBOLS AND ABBREVIATIONS:-				
SUPER SILT FENCE	SSF	SSF	SSF	
LIMIT OF DISTURBANCE	LOD	LOD	LOD	
STABILIZED CONSTRUCTION ENTRANCE				
U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION EASTERN FEDERAL LANDS HIGHWAY DIVISION STERLING, VIRGINIA PATUXENT RESEARCH REFUGE SYMBOLS AND ABBREVIATIONS				

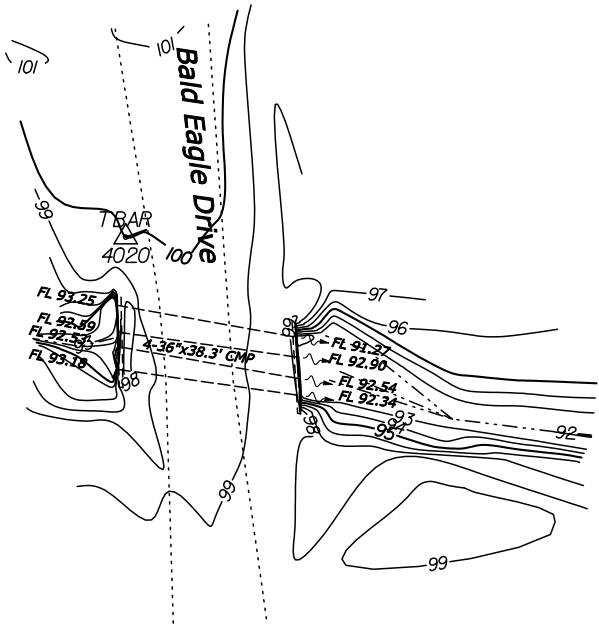
REG	STATE	PROJECT	SHEET NO.	TOTAL SHEETS
NE	MD	ERFO-PRR 14(1) 16(1)		A4

Coordinate System

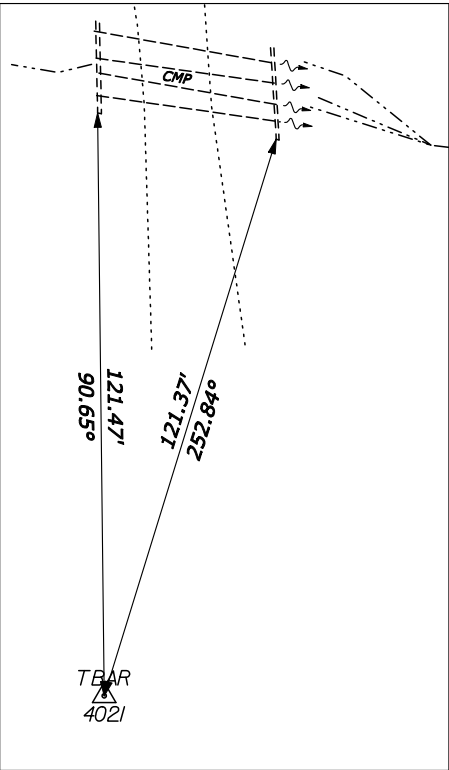
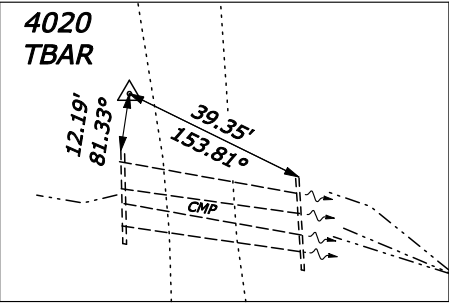
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Zone : Maryland 1900
Datum : NAD 1983 (Conus)
Geoid Model : GEOID03 (Conus)
Project : Prr14(1) 16(1)

Project Control Points

Point	Northing	Easting	Elev.	Type
4020	514396.611	1377073.372	100.000	TBAR
4021	514243.953	1377073.372	99.141	TBAR



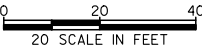
TBM
4021



U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION
STERLING, VIRGINIA

PATUXENT RESEARCH REFUGE

SURVEY INFORMATION SHEET



REG	STATE	PROJECT	SHEET NO.	TOTAL SHEETS
NE	MD	ERFO-PRR 14(1) 16(1)		A6

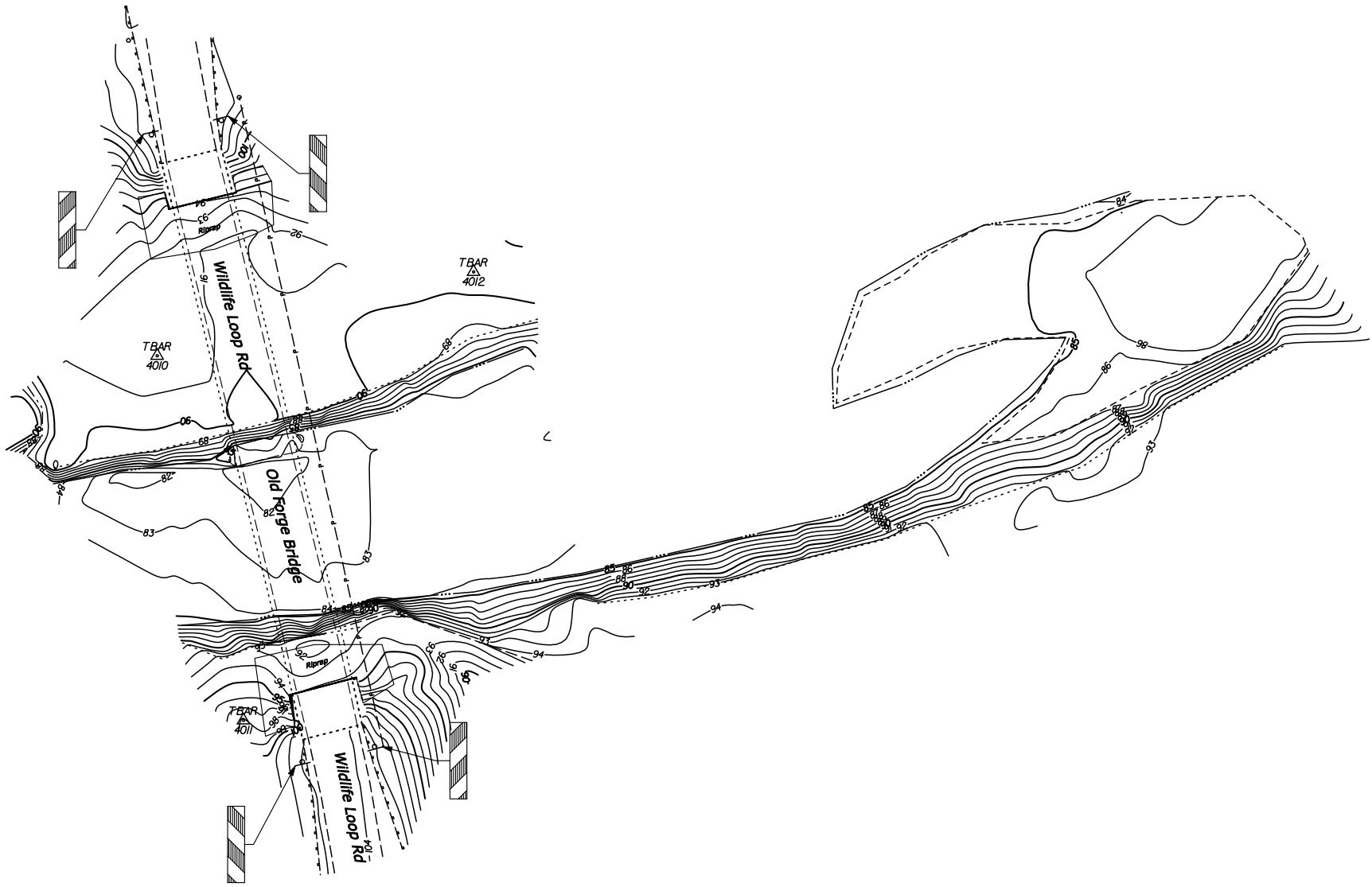
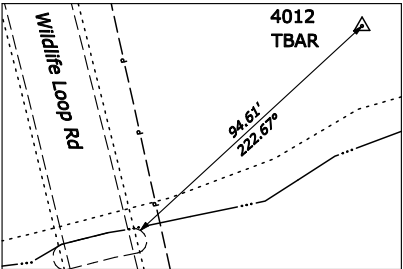
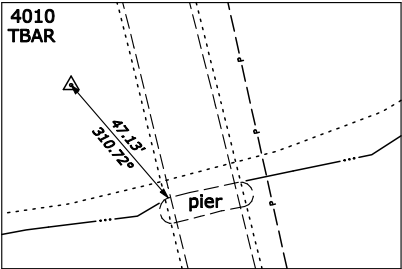
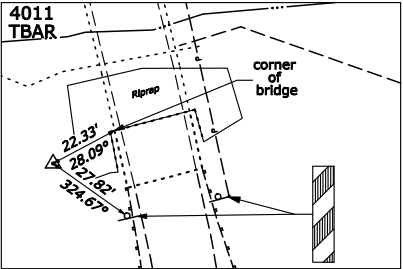
Coordinate System

Coordinate System : US State Plane 1983(Grid)
Zone : Maryland 1900
Datum : NAD 1983 (Conus)
Geoid Model : GEOID03 (Conus)
Project : Prr14(1) 16(1)



Project Control Points

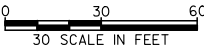
Point	Northing	Easting	Elev.	Type
4010	514618.142	1378898.120	91.573	TBAR
4011	514474.929	1378931.993	98.182	TBAR
4012	514651.114	1379022.375	90.697	TBAR

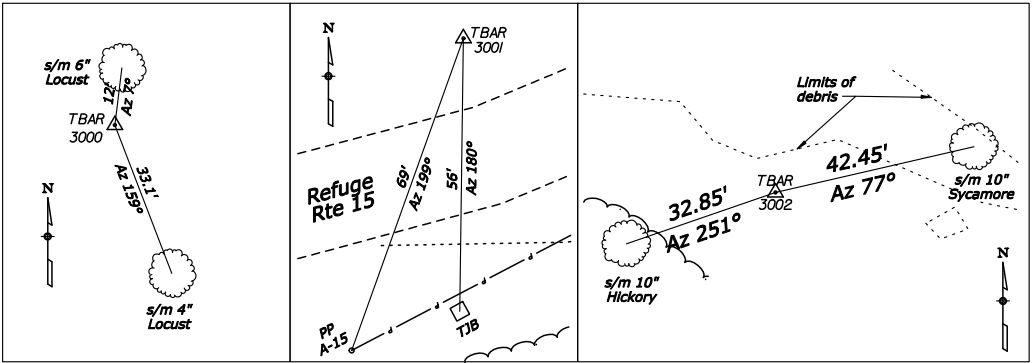
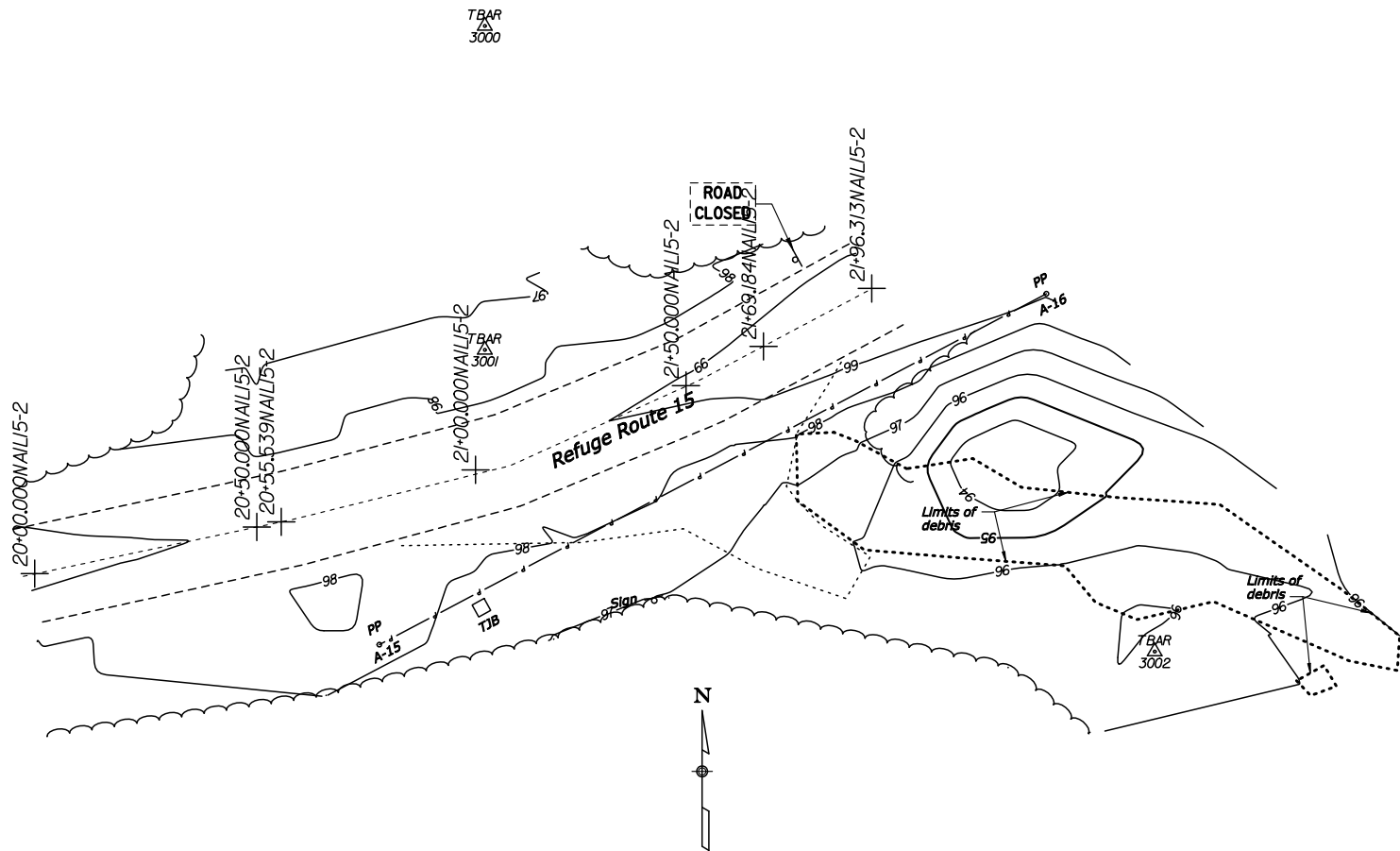


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EASTERN FEDERAL LANDS HIGHWAY DIVISION
STERLING, VIRGINIA

PATUXENT RESEARCH REFUGE

SURVEY INFORMATION SHEET





Point	Northing	Easting	Elev.	Type
3000	514132.262	1378819.765	95.679	TBAR
3001	514060.797	1378819.765	97.367	TBAR
3002	513994.239	1378967.612	96.254	TBAR

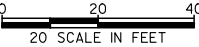
STAKED ALIGNMENT POINTS

STATION	NORTHING	EASTING	ELEV.	TYPE
20+00.000	514011.459	1378720.427	99.202	NAIL
20+50.000	514021.743	1378769.439	98.994	NAIL
20+55.539	514022.874	1378774.846	98.952	NAIL
21+00.000	514034.348	1378817.721	98.998	NAIL
21+50.000	514052.929	1378864.158	99.209	NAIL
21+69.184	514061.578	1378881.279	99.320	NAIL
21+96.313	514074.358	1378905.172	99.611	NAIL
40+00.000	514440.058	1377080.349	101.093	NAIL
40+50.000	514390.309	1377086.045	99.972	NAIL
40+73.835	514366.692	1377088.685	99.307	NAIL
41+00.000	514340.526	1377090.689	98.974	NAIL
41+24.516	514316.114	1377092.470	98.891	NAIL

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EASTERN FEDERAL LANDS HIGHWAY DIVISION
STERLING, VIRGINIA

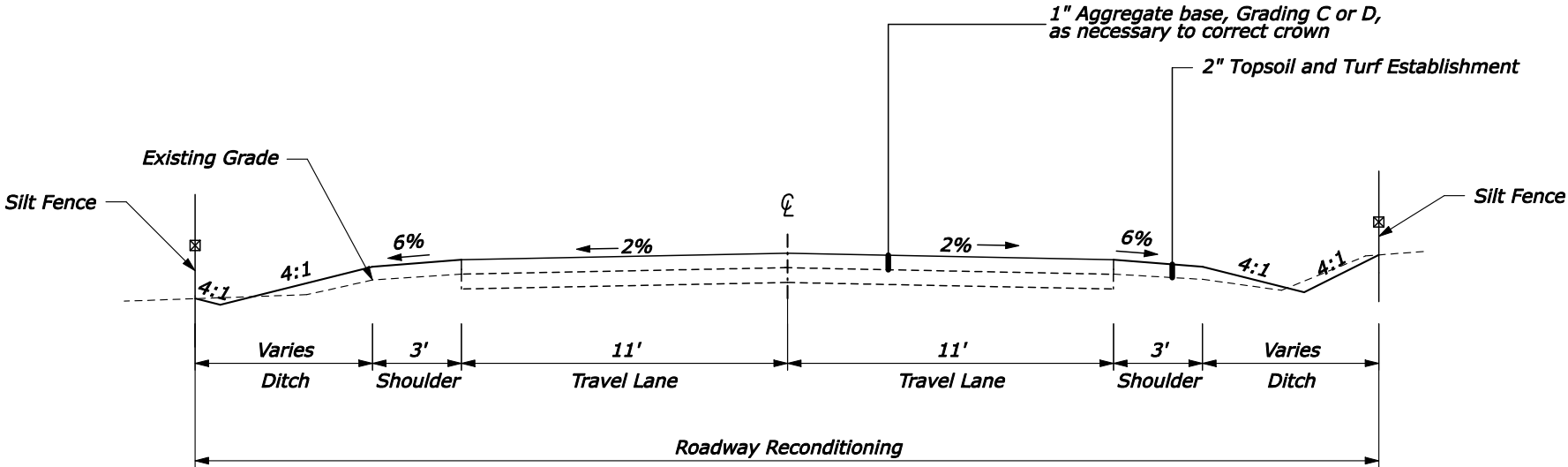
PATUXENT RESEARCH REFUGE

SURVEY INFORMATION SHEET

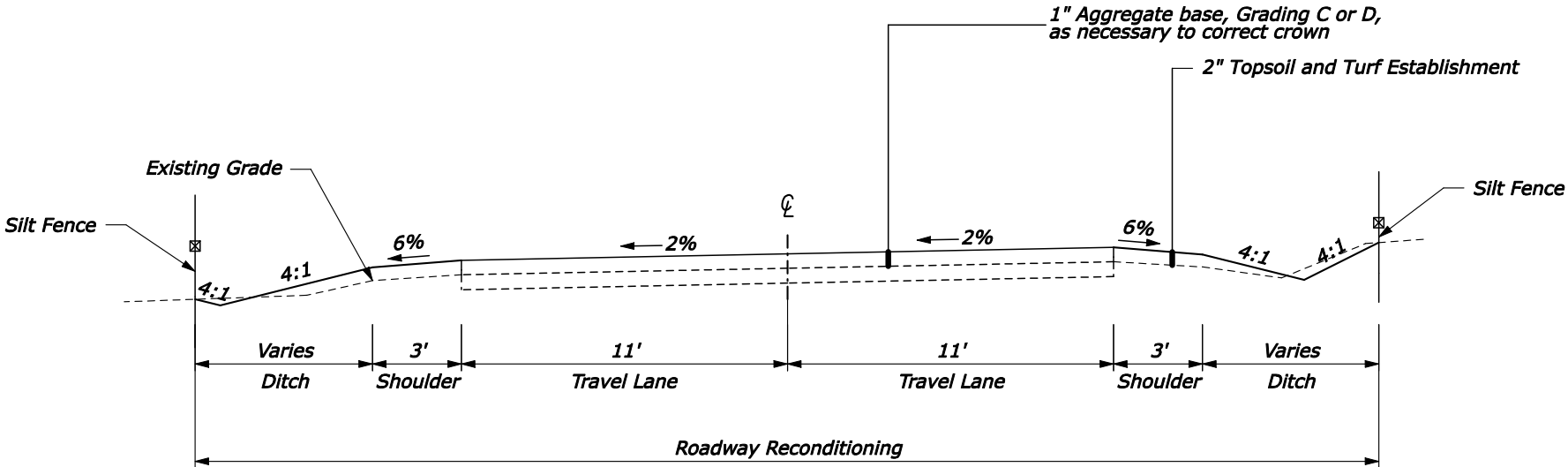


REG	STATE	PROJECT	SHEET NO.
NE	MD	ERFO-PRR 14(1), 16(1)	B1

- Notes:
- Place 2" topsoil and establish turf in all disturbed areas
 - Do not disturb areas outside silt fence



Route 14 Tangent Aggregate Surface



Route 14 Superelevated Aggregate Surface

U.S. DEPARTMENT OF TRANSPORTATION
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STERLING, VIRGINIA

PATUXENT RESEARCH REFUGE

TYPICAL SECTIONS

NOT TO SCALE

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REG	STATE	PROJECT	SHEET NO.
NE	MD	ERFO-PRR 14(1), 16(1)	CI

PLAN SHEET SECTION ----->>			Route 14 Bald Eagle Drive	Route 15 Wildlife Loop Road	Route 16 Bailey Bridge	Route 15 Old Forge Bridge	ESTIMATED QUANTITIES	
ITEM	DESCRIPTION	UNIT					PLAN	BID SCHEDULE
15101-0000	MOBILIZATION	LPSM					ALL	ALL
15201-0000	CONSTRUCTION SURVEY AND STAKING	LPSM					ALL	ALL
15401-0000	CONTRACTOR TESTING	LPSM					ALL	ALL
15705-0100	SOIL EROSION CONTROL, SILT FENCE	LNFT	5400	382			5782	6,000
15705-0100	SOIL EROSION CONTROL, SILT FENCE (Super)	LNFT				121	121	135
15705-0800	SOIL EROSION CONTROL, TEMPORARY 36-INCH PIPE CULVERT	LNFT	50				50	50
15705-1800	SOIL EROSION CONTROL, TEMPORARY DIVERSION BERM	LNFT	84				84	100
15706-1600	SOIL EROSION CONTROL, STABILIZED CONSTRUCTION ENTRANCE	EACH	2		2	1	5	5
60103-0000	REMOVAL OF HEADWALL	EACH	2				2	2
20302-2100	REMOVAL OF PIPE CULVERT	LNFT	153				153	170
20303-1600	REMOVAL OF PAVEMENT, ASPHALT	SQYD		733			733	800
20401-0000	ROADWAY EXCAVATION	CUYD		109			109	120
20701-1300	EARTHWORK GEOTEXTILE, TYPE IV-B	SQYD			161	117	278	300
20810-0000	SHORING AND BRACING	LPSM					ALL	ALL
20815-0000	COFFERDAMS	LPSM					ALL	ALL
25101-3000	PLACED RIPRAP, CLASS 3	CUYD	82		133		215	235
25101-4000	PLACED RIPRAP, CLASS 4	CUYD				170	170	190
30101-4000	AGGREGATE BASE GRADING C OR D	TON	359	221			580	650
30301-6000	ROADWAY RECONDITIONING	STA	27				27	27
40101-0100	SUPERPAVE PAVEMENT, 3/8-INCH NOMINAL MAXIMUM SIZE AGGREGATE, <0.3 MILLION ESAL (TYPE V PAVEMENT SMOOTHNESS)	TON	37				37	40
40101-0900	SUPERPAVE PAVEMENT, 3/4-INCH NOMINAL MAXIMUM SIZE AGGREGATE, <0.3 MILLION ESAL	TON		58			58	65
60103-0000	CONCRETE, HEADWALL	EACH	2				2	2
60201-1000	36-INCH PIPE CULVERT	LNFT	153				153	170
62401-0100	FURNISHING AND PLACING TOPSOIL, 2-INCH DEPTH	SQYD	3000	290			3290	3,600
62502-0000	TURF ESTABLISHMENT	SQYD	3000	290			3290	3,600
63502-0900	TEMPORARY TRAFFIC CONTROL, CONE, TYPE 28-INCH	EACH	68	18			86	86
63503-0400	TEMPORARY TRAFFIC CONTROL, CONCRETE BARRIER	LNFT	425				425	475
63504-1000	TEMPORARY TRAFFIC CONTROL, CONSTRUCTION SIGN	SQFT	91	83			174	190
63506-0500	TEMPORARY TRAFFIC CONTROL, FLAGGER	HOUR	160				160	180
63701-0000	FIELD OFFICE	EACH	1				1	1

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STERLING, VIRGINIA

PATUXENT RESEARCH REFUGE

TABULATION OF QUANTITIES

REG	STATE	PROJECT	SHEET NO.
NE	MD	ERFO-PRR 14(1), 16(1)	C2

SOIL EROSION CONTROL SUMMARY

Sheet	Pay Item	Pay Item	Pay Item	Pay Item	Pay Item	Pay Item	Pay Item
	15705-0100	15705-0100	15705-0800	15705-1800		62502-0000	62401-1000
	Soil Erosion Control, Silt Fence	Soil Erosion Control, Silt Fence (Super)	Soil Erosion Control, Temporary 36-Inch Pipe Culvert	Soil Erosion Control, Temporary Diversion Berm	Soil Erosion Control, Stabilized Construction Entrance	Turf Establishment	Furnishing and Placing Topsoil, 2-inch depth
	Lnft	Lnft	Lnft	Lnft	Each	Sqyd	Sqyd
D1	5400					3000	3000
D2			50	84	2		
E1	382					290	290
R1					2		
R2		121			1		
Subtotal this Sheet	5782	121	50	84	5	3290	3290
Rounded Total	6000	135	50	100	5	3600	3600

Note:
1. Place 2" topsoil and establish turf in all disturbed areas

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STERLING, VIRGINIA

PATUXENT RESEARCH REFUGE

EROSION CONTROL SUMMARY

REG	STATE	PROJECT	SHEET NO.
NE	MD	ERFO-PRR 14(1), 16(1)	C3

EARTHWORK SUMMARY

SHEET	Pay Item	Pay Item	Pay Item	Pay Item	Pay Item	Pay Item	Pay Item	Pay Item
	20301-1200	20302-2100	20303-1600	20401-0000	30103-4000	30302-6000	40101-0100	40101-0900
	Removal of Headwall	Removal of Pipe Culvert	Removal of Pavement, Asphalt	Roadway Excavation	Aggregate Base Grading C or D	Roadway Reconditinoing	Superpave Pavement 3/8-inch Nominal Maximum Size Aggregate, <0.3 Million ESAL (Type V Pavement Smoothness)	Superpave Pavement 3/4-inch Nominal Maximum Size Aggregate, <0.3 Million ESAL
	Each	Lnft	Sqyd	Cuyd	Cuyd	Sta	Ton	Ton
D1					359	27		
D2	2	153						
E1			733	109	221		37	58
R1								
R2								
Subtotal this Sheet	2	153	733	109	580	27	37	58
Rounded Total	2	170	800	120	650	27	40	65

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STERLING, VIRGINIA

PATUXENT RESEARCH REFUGE

EARTHWORK SUMMARY

DRAINAGE SUMMARY

SHEET	SIDE	Pay Item	Pay Item	Pay Item	Pay Item	Pay Item
		20701-1300	25101-3000	25101-4000	60103-0000	60201-1000
		Earthwork Geotextile, Type IV-B	Placed Riprap, Class 3	Placed Riprap, Class 4	Concrete, Headwall	36-Inch Pipe Culvert
		Sqyd	Cuyd	Cuyd	Each	Lnft
D1	RT		12			
	LT					
D2	RT		70		2	153
	LT					
E1	RT					
	LT					
R1	RT	161	133			
	LT					
R2	RT	117		170		
	LT					
	RT					
	LT					
	RT					
	LT					
	RT					
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	RT					
	LT					
	RT					
	LT					
	RT					
	LT					
	RT					
	LT					
	RT					
	LT					
Subtotal this Sheet		278	215	170	2	153
Rounded Total		300	235	190	2	170

REG	STATE	PROJECT	SHEET NO.
NE	MD	ERFO-PRR 14(1), 16(1)	C5

CONSTRUCTION SIGNS

[illegible]

* For information only

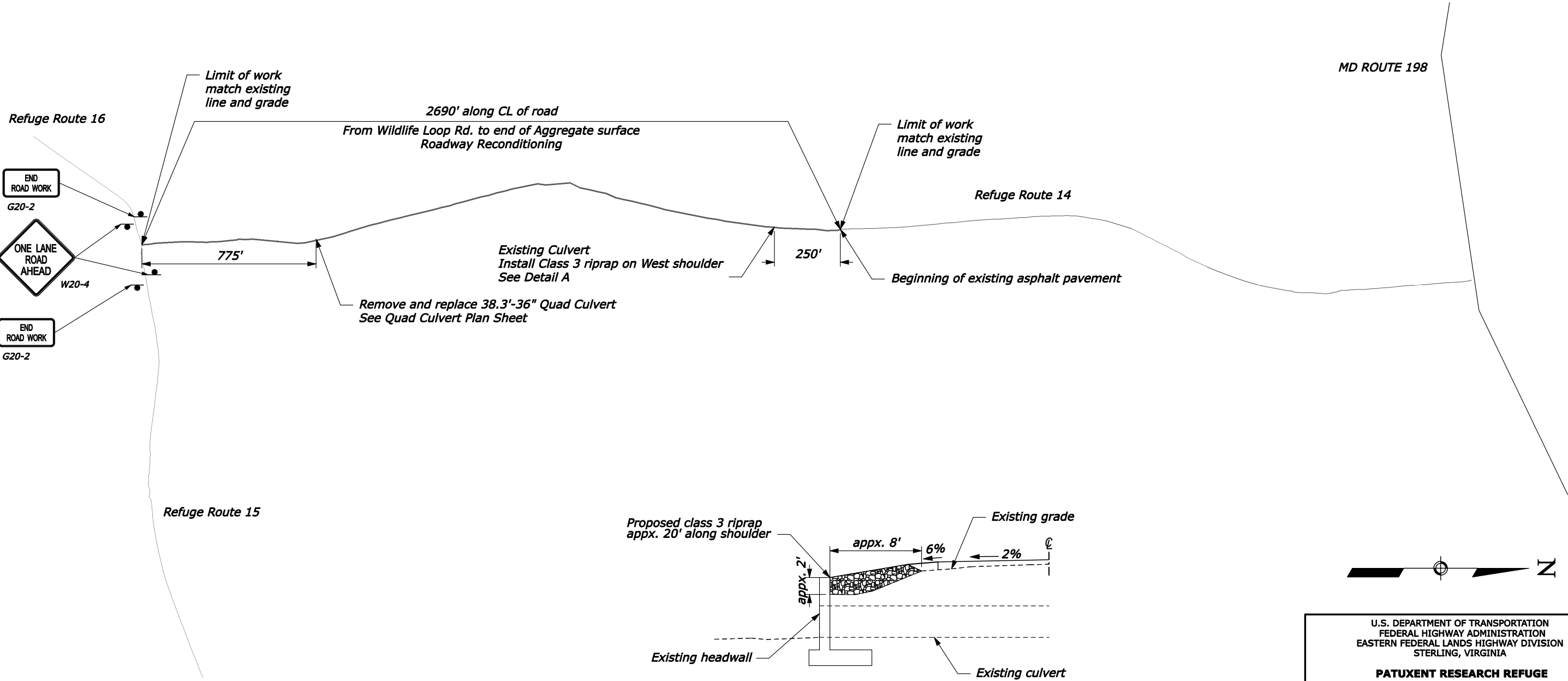
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STERLING, VIRGINIA

PATUXENT RESEARCH REFUGE

CONSTRUCTION SIGN SUMMARY

Sequence of Construction	
Activity No.	Activity
1	Set up traffic control devices
2	Set up silt fence
3	Perform construction activities keeping 1 lane open
4	Establish turf in disturbed areas
5	Remove ESC devices and stabilize vicinity
6	Remove traffic control devices

- Notes:
- See SCR subsection 107.08 regarding UXO construction support
 - See Standard Detail 635-6 for temporary traffic control plan
 - Erosion Control devices can be found on Route 14 Typical Section
 - Provide a 36' superelevation transition between tangent sections and superelevated sections



DETAIL A
NOT TO SCALE



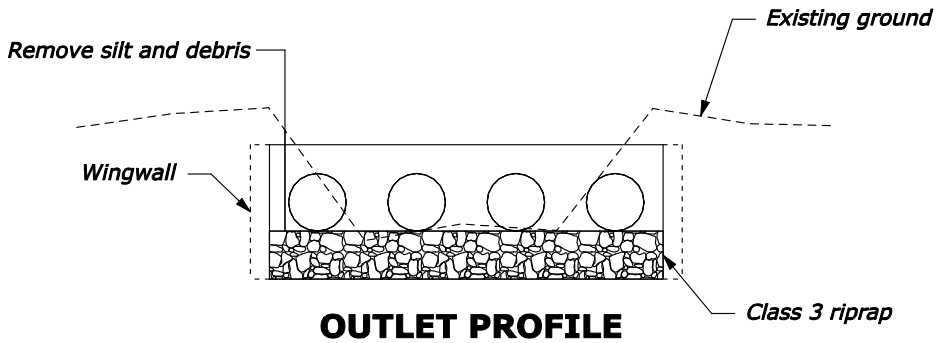
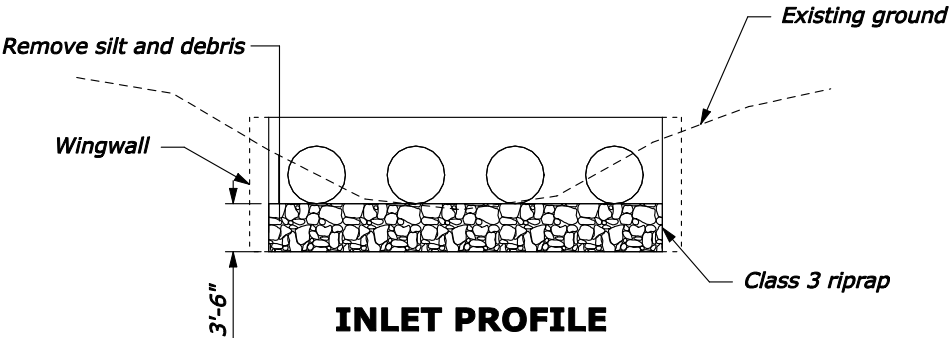
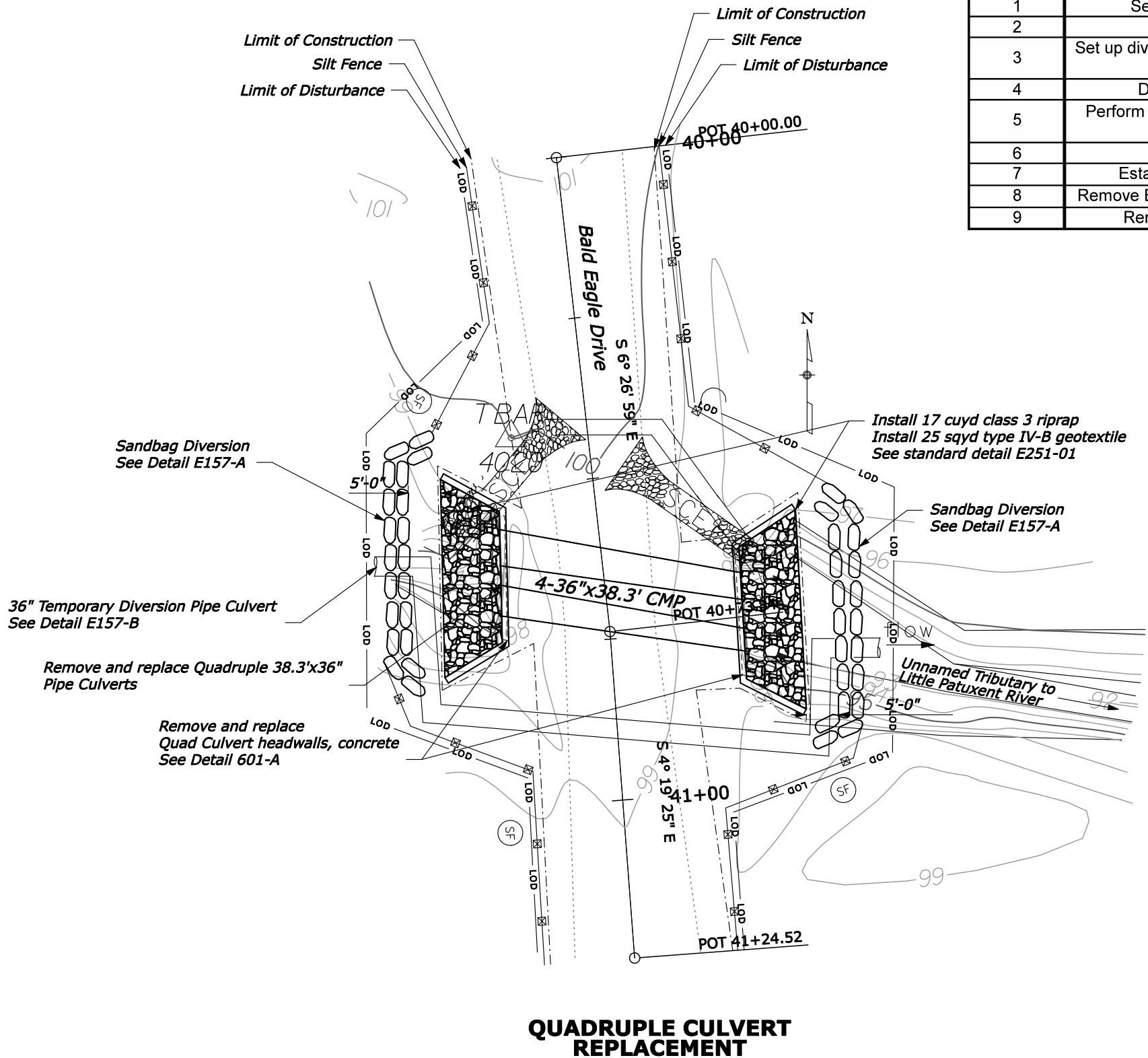
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EASTERN FEDERAL LANDS HIGHWAY DIVISION
STERLING, VIRGINIA

PATUXENT RESEARCH REFUGE

ROUTE 14
PLAN VIEW

Sequence of Construction	
Activity No.	Activity
1	Set up traffic control devices
2	Construct SCE(s)
3	Set up diversion berm and install temporary diversion pipe
4	Dewater construction area
5	Perform construction activities keeping 1 lane open
6	Place riprap protection
7	Establish turf in disturbed areas
8	Remove ESC devices and stabilize vicinity
9	Remove traffic control devices

- Note:**
- See SCR subsection 107.08 regarding UXO construction support.
 - Provide construction access plan to the CO for CO and MDE approval prior to construction.
 - Tie ends of diversion berm into the slope to prevent water from entering the work area.
 - Place dewatering devices as approved by the CO and MDE inspector. Dewatering devices shall be operational during working hours and as needed to complete construction. Perform all stream work in the dry. Turn off dewatering devices when a major storm event is anticipated.
 - Inspect the diversion berm daily and maintain while in use; repairing as needed after rainfall events or as directed by the CO and the MDE Inspector.
 - As a minimum provide a diversion berm with a minimum of 6-inches above the diverted water level for a 2-year event. Submit plans for diversion berm to the CO and the MDE Inspector for approval prior to installation.
 - See Detail E157-A and Detail E157-B for diversion berm and dewatering.



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FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION
STERLING, VIRGINIA

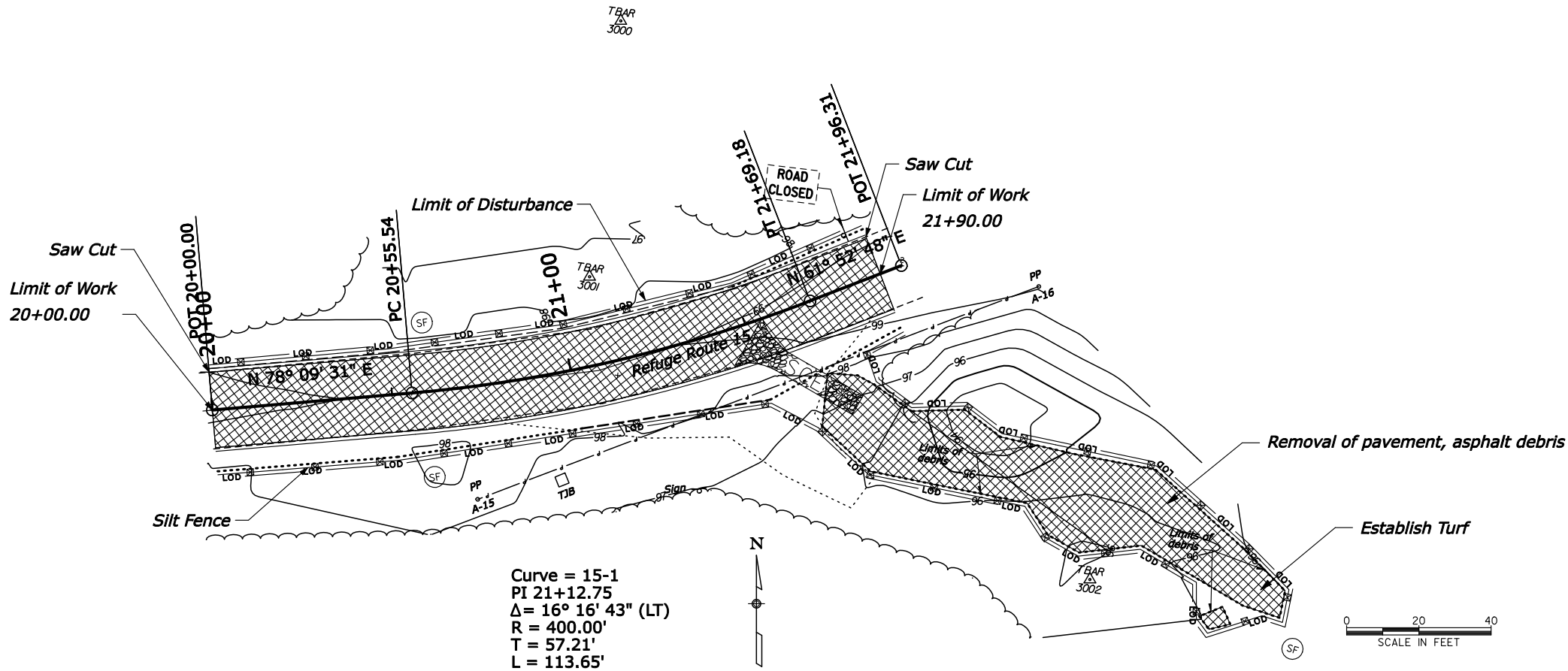
PATUXENT RESEARCH REFUGE

ROUTE 14 QUAD CULVERT PLAN VIEW



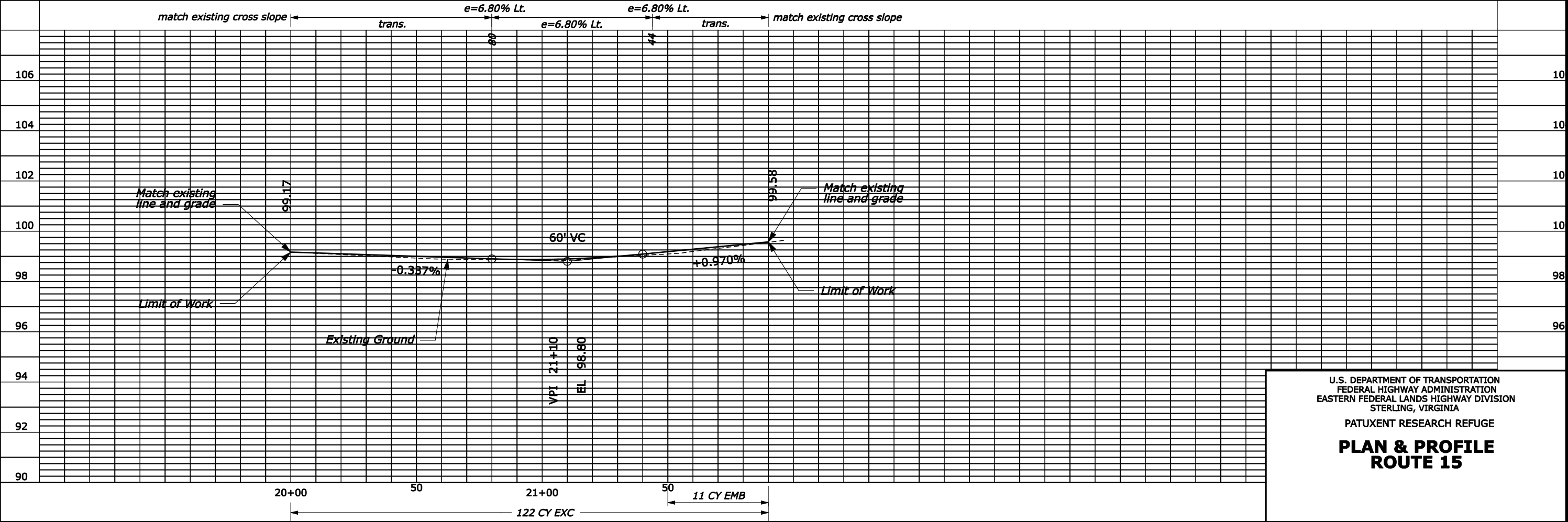
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REG	STATE	PROJECT	SHEET NO.
NE	MD	ERFO-PRR 14(1) 16(1)	E1



Sequence of Construction	
Activity No.	Activity
1	Set up traffic control devices
2	Construct SCE(s)
3	Set up silt fence
4	Perform construction activities
5	Establish turf in disturbed areas
6	Remove ESC devices and stabilize vicinity
7	Remove traffic control devices

- Note:
- See SCR subsection 107.08 regarding UXO construction support
 - See Standard Detail 635-7 for temporary traffic control plan
 - See erosion and sediment control plan for detailed seed mix information



U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION
STERLING, VIRGINIA
PATUXENT RESEARCH REFUGE
**PLAN & PROFILE
ROUTE 15**

I. EROSION AND SEDIMENT CONTROL NARRATIVE

See the Maryland Department of the Environment (MDE) Standard Erosion and Sediment Control Notes for additional information.

PROJECT DESCRIPTION

Project ERFO-PRR 14(1) 16(1) consists of reconditioning 0.5 miles of Bald Eagle Drive, replacing a quadruple 36" culvert on Bald Eagle Drive, installing riprap near culverts on Bald Eagle Drive, repairing an asphalt washout on Wildlife Loop Road, and repairing riprap at both abutments of Old Forge Bridge and Bailey Bridge.

EXISTING CONDITIONS

The storm water runoff is drained into the Little Patuxent River, the Patuxent River, and the Chesapeake Bay.

CRITICAL AREAS

The land disturbances on Bald Eagle surrounding the damaged quadruple culvert and on the Little Patuxent River near the abutments of Bailey Bridge and Old Forge Bridge are considered critical areas. These areas will require the installation of perimeter controls (e.g., silt fence, super silt fence, cofferdams, temporary diversion berms) to control erosion and sediment.

SEQUENCE OF CONSTRUCTION

Obtain approval from the CO and the MDE Inspector for any revisions to the sequence of construction.

1. Notify the Maryland Department of the Environment (MDE) compliance program officer at 410-537-3510, at least seven calendar days prior to the beginning of construction to arrange for a pre-construction conference. Provide cofferdam shop drawings to the CO and MDE Inspector for approval.
2. Place temporary construction signs as required.
3. Clear and grub those areas necessary for installation of perimeter sediment controls and install silt fence and super silt fence.
4. Construct the stabilized construction entrance and access route as described in the plans. Install protective fencing to preserve existing vegetation, trees and shrubs when possible. At no time is construction allowed to go out of the project limits indicated on the Location Map.
5. Install cofferdams and temporary diversion berms, re-route the tributary stream as shown in the plans and dewater the construction areas using water filtration bags.
6. Perform work per plans and specifications.
7. Stabilize finished slopes and other disturbed areas.
8. Obtain approval from the CO and the MDE Inspector before removing controls.
9. Remove sediment controls and stabilize finished slopes.

II. EROSION AND SEDIMENT CONTROL MEASURES

STRUCTURAL MEASURES WILL INCLUDE

Super Silt Fence (E157.05): A system of super silt fence is proposed for filtering runoff from disturbed areas before it enters any environmentally sensitive areas.

Temporary Diversion Berm (E157.09): Temporary Diversion Berms are proposed to prevent clean water within the dewatering area and provide a dry area for headwall and riprap placement. See details E157-A and E157-B for diversion berm and water filtration bag specifications.

Cofferdam (208.06): A system of cofferdams is proposed to prevent clean water within the dewatering area and provide a dry area for riprap placement. See detail E157-B for water filtration bag specifications.

Erosion control devices are included in the typical sections (sheet B1), plan & profile sheets (D and E sheets) and bridge plans (R sheets).

VEGETATIVE MEASURES WILL INCLUDE

Following soil disturbance, complete permanent or temporary stabilization within seven (7) calendar days on the surface of all perimeter controls, dikes, swales, ditches, perimeter slopes and all slopes greater than 3 horizontal to 1 vertical (3:1); and within fourteen (14) calendar days on all other disturbed or graded areas on the project site.

Apply seed at the rates for each season as follows:

Name of Seed (Scientific Name)	Rates (Percent in Mix*)
Barnyard Grass (Echinochola crusgalli)	10%
Common Foxtail (Setaria faberii)	10%
Red Top (Agrostis alba)	10%
Switchgrass (Panicum vergatum)	10%
Red Fescue (Festuca rubra)	20%
Perennial Ryegrass (Lolium perenne)	20%
Annual Ryegrass (Lolium multiflorum)	20%

*Plant mix at the rate of 30 lbs/acre.

Apply limestone and fertilizer at the following rates:

Item	Rate (pounds per acre)
Agricultural Limestone (85 percent CaCO3)	700
Fertilizer	3100

MAINTENANCE

Unless stated otherwise, construct and maintain weekly, or more frequently where specified in the plans or as directed by the CO or MDE Inspector, and after each significant rainfall. Identify any damaged devices and assess the adequacy of the erosion control plan. Repair or replace all damaged erosion and sediment control devices by the end of the day. Submit suggested improvements to the erosion control plan to the CO and the MDE Inspector for approval. Document the inspections according to Subsection 107.01.

Super Silt Fence: Check super silt fence for undermining or deterioration of the fabric. Remove the accumulated sediment in order to ensure proper functioning of the silt fence installation.

Temporary Diversion Berms: Check temporary diversion berms for undermining, damage, or leakage. Repair or replace damaged sandbags or plastic lining to ensure proper functioning of the temporary diversion berm installation.

Do not drive construction equipment across flowing waterways.

Do not allow construction vehicles to track sediment off site of the project limits.

In general, preserve existing vegetation, trees and shrubs when possible, and where specifically shown in the plans or as directed by the CO.

OWNER'S/DEVELOPERS CERTIFICATION

I/WE HEREBY CERTIFY THAT ALL CLEARING, GRADING, CONSTRUCTION, AND/OR DEVELOPMENT WILL BE DONE PURSUANT TO THIS PLAN AND THAT ANY RESPONSIBLE PERSONNEL INVOLVED IN THE PROJECT WILL HAVE A CERTIFICATE OF ATTENDANCE AT A MARYLAND DEPARTMENT OF THE ENVIRONMENT APPROVED TRAINING PROGRAM FOR THE CONTROL OF SEDIMENT AND EROSION BEFORE BEGINNING THE PROJECT. I HEREBY AUTHORIZE THE RIGHT OF ENTRY FOR PERIODIC ON-SITE EVALUATION BY STATE OF MARYLAND, DEPARTMENT OF THE ENVIRONMENT, COMPLIANCE INSPECTORS.

7/15/2008
DATE
OWNER/DEVELOPER

DOUGLAS NAIR - CONSTRUCTION OPERATIONS ENGINEER
PRINTED NAME AND TITLE

MDE CARD HOLDER:
THOMAS SCOTT - Construction Engineer
PRINTED NAME AND TITLE

03044
CARD NO.

DESIGN CERTIFICATION

I HEREBY CERTIFY THAT THIS PLAN HAS BEEN DESIGNED IN ACCORDANCE WITH THE 1994 MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL, THE 2000 MARYLAND STORMWATER DESIGN MANUAL VOLUMES I & II AND THE MARYLAND DEPARTMENT OF THE ENVIRONMENT EROSION AND SEDIMENT CONTROL AND STORMWATER MANAGEMENT REGULATIONS.

7/15/2008
DATE
THOMAS SHIFFLETT - Project Manager
PRINTED NAME AND TITLE

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION
STERLING, VIRGINIA

PATUXENT RESEARCH REFUGE

EROSION CONTROL
NARRATIVE

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REG	STATE	PROJECT	SHEET NO.
NE	MD	ERFO-PRR 14(1), 16(1)	M2

MARYLAND DEPARTMENT OF THE ENVIRONMENT
Standard Erosion and Sediment Control Notes

- The Contractor shall notify the Water Management Administration (WMA) at (410) 537-3510 seven (7) days before commencing any land disturbing activity and, unless waived by the WMA, shall be required to hold a pre-construction meeting between project representatives and a representative of WMA.
- The Contractor must notify WMA in writing and by telephone at the following points:
 - The required pre-construction meeting.
 - Following installation of sediment control measures.
 - During the installation of sediment basins (to be converted into permanent stormwater management structures) at the required inspection points (see inspection checklist on plan). Notification prior to commencing construction of each step is mandatory.
 - Prior to removal or modification of any sediment control structure(s).
 - Prior to removal of all sediment control devices.
 - Prior to final acceptance.
- The Contractor shall construct all erosion and sediment control measures per the approved plan and construction sequence and shall have them inspected and approved by the agency inspector or WMA Inspector prior to beginning any other land disturbances. Minor sediment control device location adjustments may be made in the field with the approval of the WMA Inspector. The Contractor shall ensure that all runoff from disturbed areas is directed to the sediment control devices, and shall not remove any erosion or sediment control measure without prior permission from the WMA Inspector and the agency inspector. The Contractor must obtain prior agency and WMA approval for changes to the Erosion Control Plan and/or Sequence of Construction.
- The Contractor shall protect all points of construction ingress and egress to prevent the deposition of materials onto public roads. All materials deposited onto public roads shall be removed immediately.
- The Contractor shall inspect daily and maintain continuously in an effective operating condition all erosion and sediment control measures until such times as they are removed with prior permission from the WMA Inspector and the agency inspector.
- All sediment basins, trap embankments and slopes, perimeter dikes, swales and all disturbed slopes steeper or equal to 3:1 shall be stabilized with sod or seed and anchored straw mulch, or other approved stabilization measures, as soon as possible but no later than seven (7) calendar days after establishment. All areas disturbed outside of the perimeter sediment control system must be minimized. Maintenance must be performed as necessary to ensure continued stabilization. (Requirement for stabilization may be reduced to three (3) days for sensitive areas).
- The Contractor shall apply sod or seed and anchored straw mulch, or other approved stabilization measures to all disturbed areas and stockpiles within fourteen (14) calendar days after stripping and grading activities have ceased in the area. Maintenance shall be performed as necessary to ensure continued stabilization. (Requirement may be reduced to seven (7) days for sensitive areas).
- Prior to removal of sediment control measures, the Contractor shall stabilize and have established permanent stabilization for all contributory disturbed areas using sod or an approved permanent seed mixture with required soil amendments and an approved anchored mulch. Wood fiber mulch may only be used in seeding season where the slope does not exceed 10% and grading has been done to promote sheet flow drainage. Areas brought to finished grade during the seeding season shall be permanently stabilized as soon as possible, but no later than fourteen (14) calendar days after establishment. When property is brought to finished grade during the months of November through February, and permanent stabilization is found to be impractical, temporary seed and anchored straw mulch shall be applied to disturbed areas. The final permanent stabilization of such property shall be applied March 15 or earlier if ground and weather conditions allow.
- The sites approval letter, approved Erosion and Sediment Control Plans, daily log books and test reports shall be available at the site for inspection by duly authorized officials of WMA and the agency responsible for the project.

- Surface drainage flows over unstabilized cut and fill slopes shall be controlled by either preventing drainage flows from traversing the slopes or by installing protective devices to lower the water downslope without causing erosion. Dikes shall be installed and maintained at the top of a cut or fill slope until the slope and drainage area to it are fully stabilized, at which time they must be removed and final grading done to promote sheet flow drainage. Protective methods must be provided at points of concentrated flow where erosion is likely to occur.
- Permanent swales or other points of concentrated water flow shall be stabilized with sod or seed with an approved erosion control matting, riprap, or by other approved stabilization measures.
- Temporary sediment control devices may be removed, with permission of the WMA Inspector and agency inspectors, within thirty (30) calendar days following establishment of permanent stabilization in all contributory drainage areas. Stormwater management structures used temporarily for sediment control shall be converted to the permanent configuration within this time period as well.
- No permanent cut or fill slope with a gradient steeper than 3:1 will be permitted in lawn maintenance areas. A slope gradient of up to 2:1 will be permitted in non-maintenance areas provided that those areas are indicated on the erosion and sediment control plan with a low-maintenance ground cover specified for permanent stabilization. Slope gradient steeper than 2:1 will not be permitted with vegetative stabilization.
- For finished grading, the Contractor shall provide adequate gradients to prevent water from ponding for more than twenty four (24) hours after the end of a rainfall event. Drainage courses and swale flow areas may take as long as forty-eight (48) hours after the end of a rainfall event to drain. Areas designed to have standing water shall not be required to meet this requirement.
- Sediment traps or basins are not permitted within 20 feet of a foundation that exists or is under construction. No structure may be constructed within 20 feet of an active sediment trap or basin.
- The WMA Inspector has the option of requiring additional safety or sediment control measures, if deemed necessary.
- All trap depth dimensions are relative to the outlet elevation. All traps must have a stable outfall. All traps and basins shall have stable inflow points.
- Vegetative stabilization shall be performed in accordance with the Standards and Specifications for Soil Erosion and Sediment Control. Refer to appropriate specifications for temporary seeding, permanent seeding, mulching, sodding, and ground covers.
- Sediment shall be removed and the trap or basin restored to its original dimensions when the sediment has accumulated to one quarter of the total depth of the trap or basin. Total depth shall be measured from the trap or basin bottom to the crest of the outlet.
- Sediment removed from traps (and basins) shall be placed and stabilized in approved areas, but not within a floodplain, wetland or tree-save area. When pumping sediment laden water, the discharge must be directed to a sediment trapping device prior to release from the site. A sump pit may be used if sediment traps themselves are being pumped out.
- All water removed from excavated areas (e.g. utility trenches) shall be passed through an approved dewatering practice or pumped to a sediment trap or basin prior to discharge from the site (i.e. via functional storm drain system or to stable ground surface).

- Sediment control for utility construction for areas outside of designed controls or as directed by the C.O. or WMA Inspector:
 - Call "Miss Utility" at 1-800-257-7777 48 hours prior to the start of work.
 - Excavated trench material shall be placed on the high side of the trench.
 - Trenches for utility installation shall be backfilled, compacted and stabilized at the end of each working day. No more trench shall be opened than can be completed the same day, unless:
 - Temporary silt fence shall be placed immediately downstream of any disturbed area intended to remain disturbed for more than one day.
- Where deemed appropriate by the C.O. or the WMA inspector, sediment basins and traps may need to be surrounded with an approved safety fence. The fence must conform to local ordinances and regulations. The developer or owner shall check with local building officials on applicable safety requirements. Where safety fence is deemed appropriate and local ordinances do not specify fencing sizes and types, the following shall be used as a minimum standard: The safety fence must be made of welded wire and at least 42 inches high, have posts spaced no farther apart than 8 feet, have mesh openings no greater than 2 inches in width and 4 inches in height with a minimum of 14 gauge wire. Safety fence must be maintained and in good condition at all times.
- Off-site spoil or borrow areas on State or federal property must have prior approval by WMA and other applicable State, federal and local agencies; otherwise approval must be granted by the local authorities. All waste and borrow areas off-site must be protected by sediment control measures and stabilized.
- Sites where infiltration devices are used for the control of stormwater, extreme care must be taken to prevent runoff from unstabilized areas from entering the structure during construction. Sediment control devices placed in infiltration areas must have bottom elevations at least two (2) feet higher than the finish grade bottom elevation of the infiltration practice. When converting a sediment trap to an infiltration device, all accumulated sediment must be removed and disposed of prior to final grading of the infiltration device.
- When a storm drain system outfall is directed to a sediment trap or sediment basin and the system is to be used for temporarily conveying sediment laden water, all storm drain inlets in non-sump areas shall have temporary asphalt berms constructed at the time of base paving to direct gutter flow into the inlets to avoid surcharging and overflow of inlets in sump areas.
- Site Information:

a.Total Area of Facility (base, campus, park, etc.)	12,750 Acres
b.Total Area of Project Site	2.30 Acres
c. Area Disturbed	1.60 Acres
d. Area to be Roofed or Paved	0 Acres
e.Total Cut	300 Cubic Yards
f.Total Fill	750 Cubic Yards

g. Off-Site Waste / Borrow Area Location

To be determined by the contractor and approved by the MDE sediment control Inspector

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION
STERLING, VIRGINIA

PATUXENT RESEARCH REFUGE

EROSION CONTROL
NARRATIVE

Maryland Department of the Environment Best Management Practices for Nontidal Wetlands of Special State Concern (NTWSSC) and Expanded Buffers.

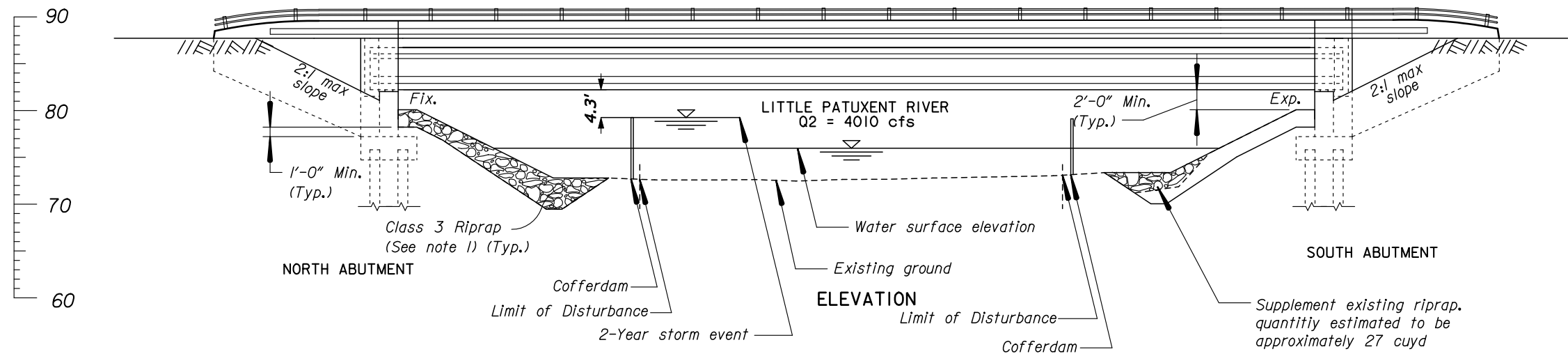
If a permit or other authorization is granted, the Department may require an applicant to comply with the best management practices, including one or more of the following:

- A.Protect against future disturbances to the nontidal wetland of special State concern by showing its surveyed boundary, expanded buffer, waterways, and 100-year floodplains on the property deed and recording the information with the county;
- B.Avoid impacts to regulated wetlands, buffers, expanded buffers, waterways, 100-year floodplains and steep slopes or highly erodible soils as described in COMAR 26.23.01.04C that may cause an adverse impact to the nontidal wetland of special State concern;
- C.Restrict regulated activities to the minimum area necessary to meet the project purpose;
- D.Maintain existing groundwater recharge to the nontidal wetland of special State concern and tributaries to nontidal wetlands of special State concern by limiting impervious surfaces;
- E.Use non-structural stormwater management practices to the extent practicable, such as infiltration, retention of forest, wetlands and associated buffers, undisturbed floodplains, open space, and steep slopes, in association with structural stormwater management on properties with nontidal wetlands of special State concern. Stormwater practices shall be consistent with those in COMAR 26.17.02;
- F.Manage Runoff so there is no direct discharge of stormwater into wetlands or waterways;
- G.Restrict impervious surface on the project site to 15 percent or less, where practicable;
- H.Install sediment controls such as super silt fences or comparable controls to completely surround all disturbed areas and maintain controls daily;
- I.Stabilize disturbed areas daily with non-invasive native species;
- J.Place vegetative waste, including yard waste, grass clippings, leaves, etc. or other debris outside of regulated wetlands, expanded buffers, waterways, and 100-year floodplains that are in the drainage area of the nontidal wetland of special State concern; or
- K.Use other management practices listed in COMAR 26.23.03.02 of this regulation.

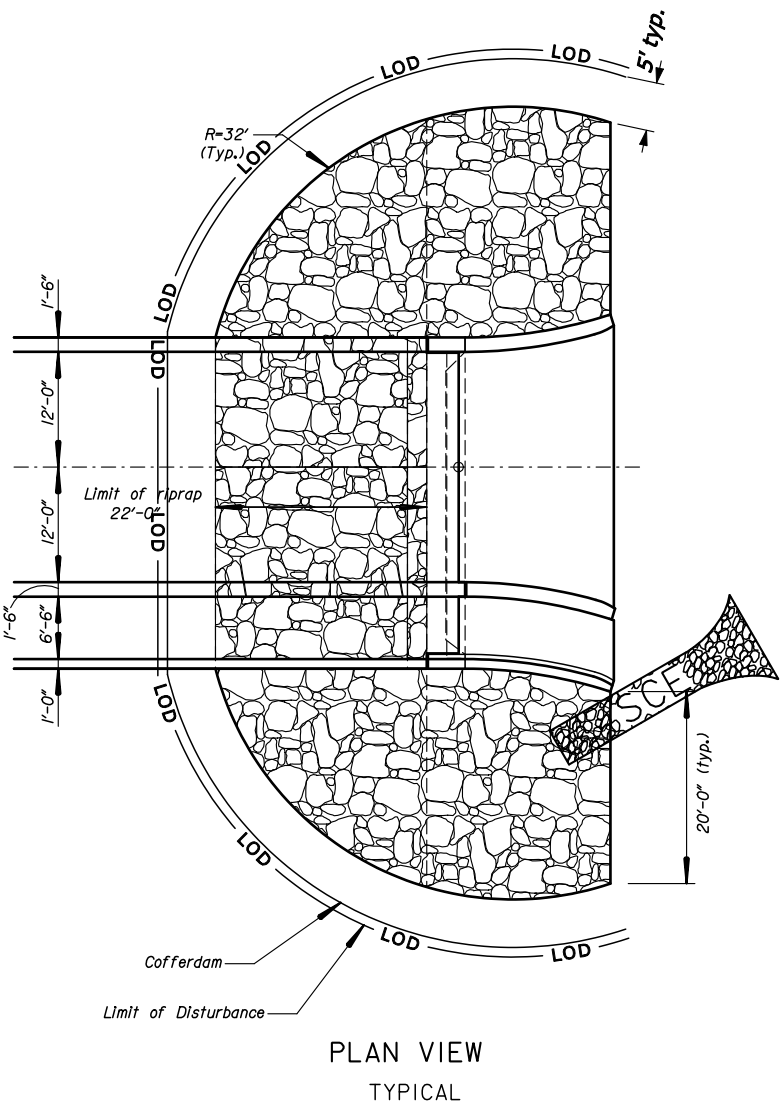
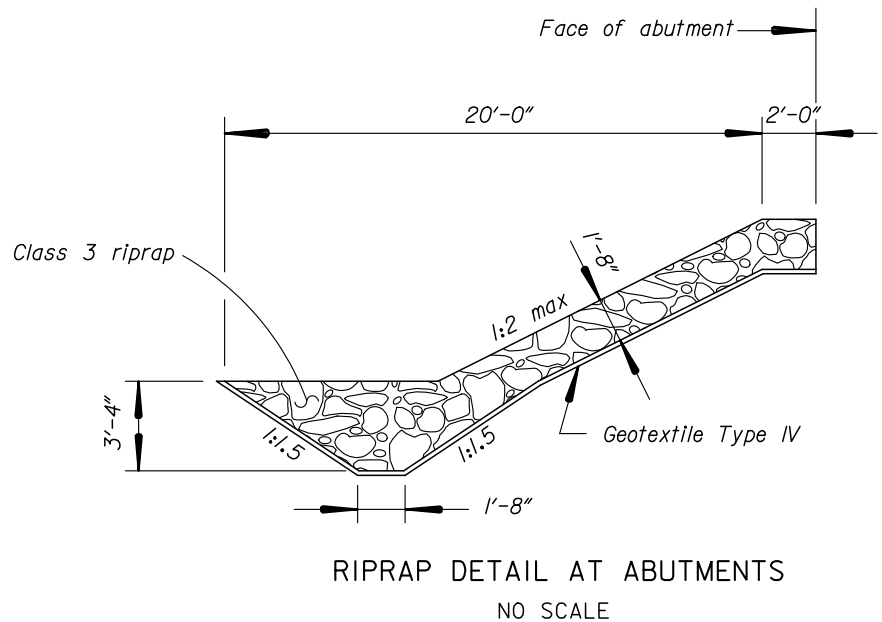
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FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION
STERLING, VIRGINIA

PATUXENT RESEARCH REFUGE

EROSION CONTROL
NARRATIVE



Sequence of Construction	
Activity No.	Activity
1	Construct SCE(s)
2	Set up cofferdam
3	Dewater construction area
4	Perform construction activities
5	Establish turf in disturbed areas
6	Remove ESC devices and stabilize vicinity



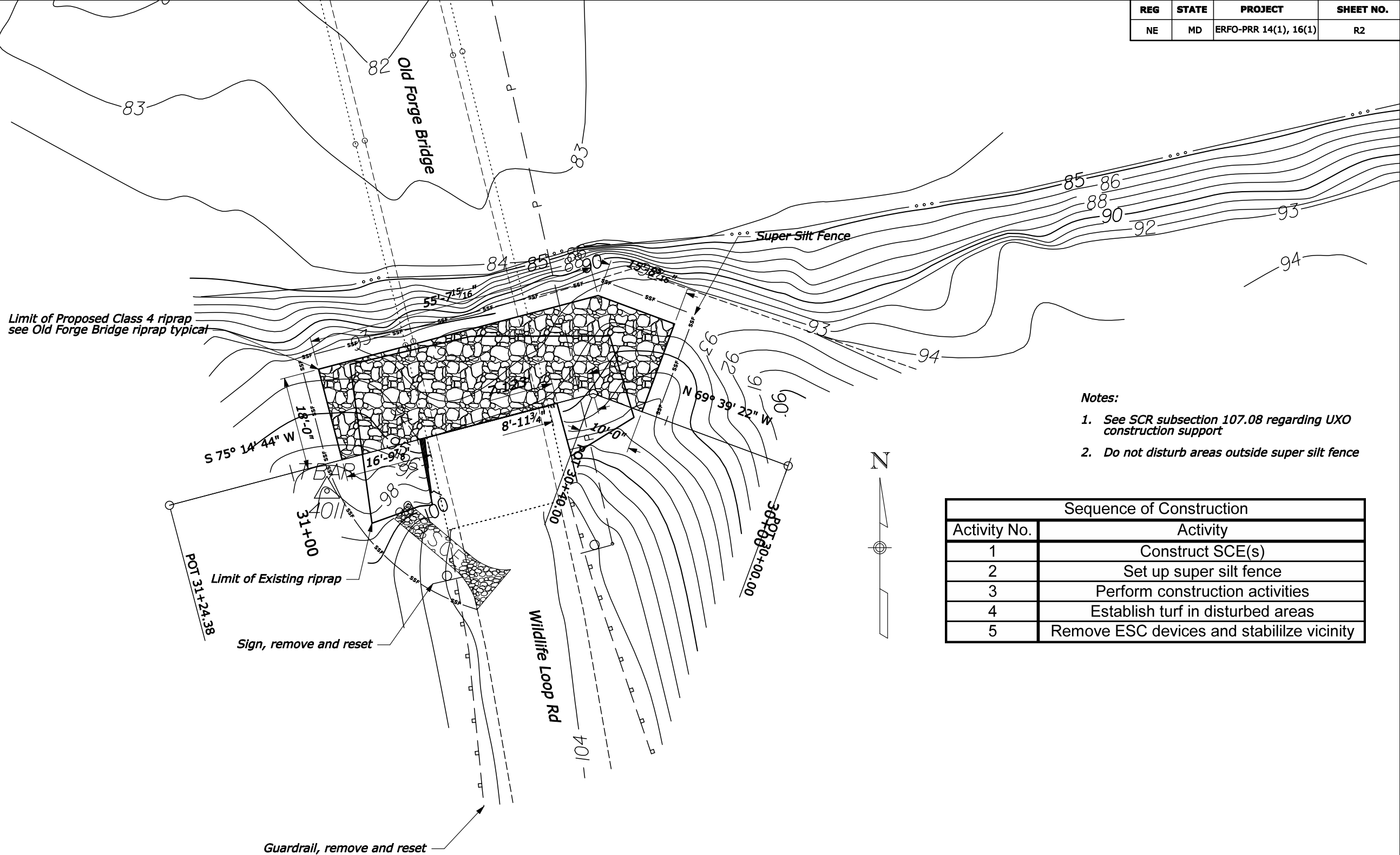
- Notes:
- 1- Place riprap on top of footing in a manner not to damage the top and edges of the concrete footing.
 - 2- Overlap geotextile a minimum of 18" where overlap occurs. Place transverse laps so the upstream strip overlaps the downstream strip. Place horizontal laps so the upper strip laps over the lower strip. Install fastener pins through both strips of overlapped fabric at no less than 5 foot intervals along a line through the midpoint of the overlap and at any other locations as required to prevent any slippage of the fabric.
 - 3- See SCR subsection 107.08 regarding UXO construction support
 - 4- Tie ends of cofferdam into the slope to prevent water from entering the work area.
 - 5- Dewatering devices shall be operational during working hours and as needed to complete construction. Perform all stream work in the dry. Turn off dewatering devices when a major storm event is anticipated.
 - 6- Inspect the cofferdam daily and maintain while in use; repairing as needed after rainfall events or as directed by the CO and the MDE inspector.
 - 7- Submit plans for cofferdam diversion and filter bag placement to the CO and MDE inspector for approval prior to installation.
 - 8- See Detail E157-A and Detail E157-B for cofferdam and dewatering. Place dewatering devices as approved by the CO and MDE inspector.
 - 9- No more than one cofferdam may be used at any time.

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION
STERLING, VIRGINIA

PATUXENT RESEARCH REFUGE

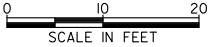
**BAILEY BRIDGE
RIPRAP DETAIL**

REG	STATE	PROJECT	SHEET NO.
NE	MD	ERFO-PRR 14(1), 16(1)	R2



- Notes:
1. See SCR subsection 107.08 regarding UXO construction support
 2. Do not disturb areas outside super silt fence

Sequence of Construction	
Activity No.	Activity
1	Construct SCE(s)
2	Set up super silt fence
3	Perform construction activities
4	Establish turf in disturbed areas
5	Remove ESC devices and stabilize vicinity

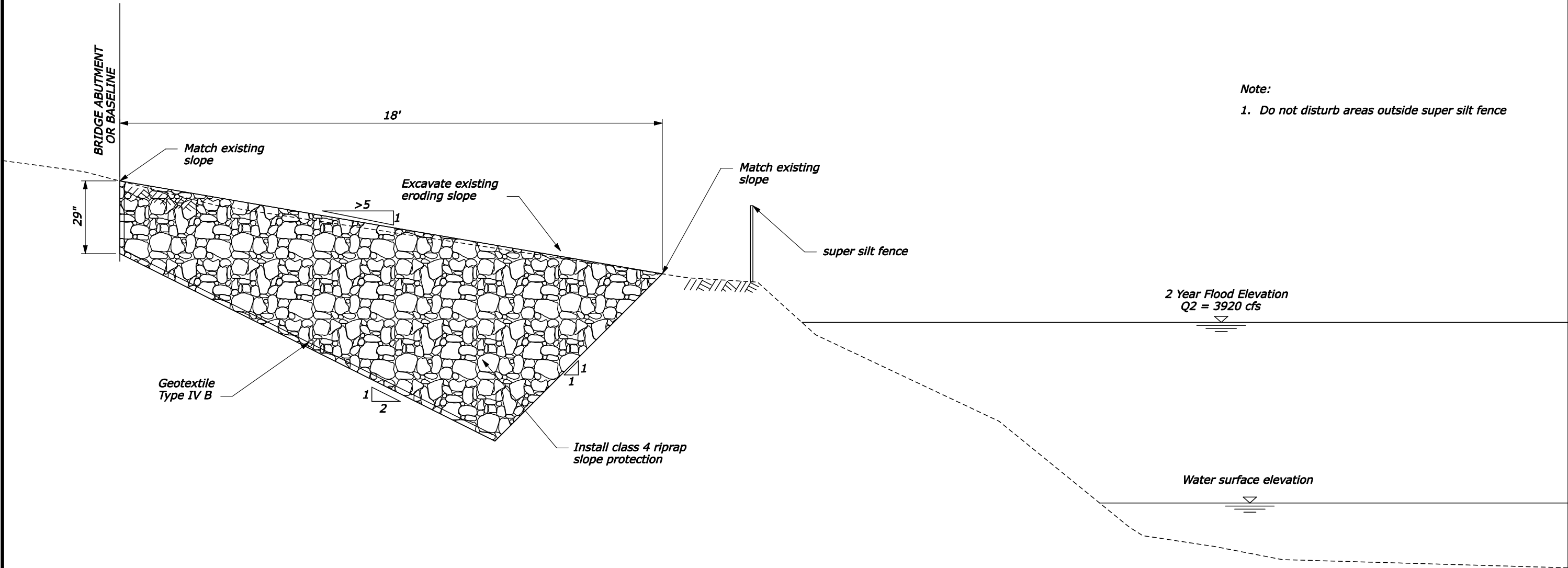


U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION
STERLING, VIRGINIA

PATUXENT RESEARCH REFUGE

**OLD FORGE BRIDGE
RIPRAP PLAN**

REG	STATE	PROJECT	SHEET NO.
NE	MD	ERFO-PRR 14(1), 16(1)	R3



Note:
1. Do not disturb areas outside super silt fence

TYPICAL SECTION LOOKING UPSTREAM

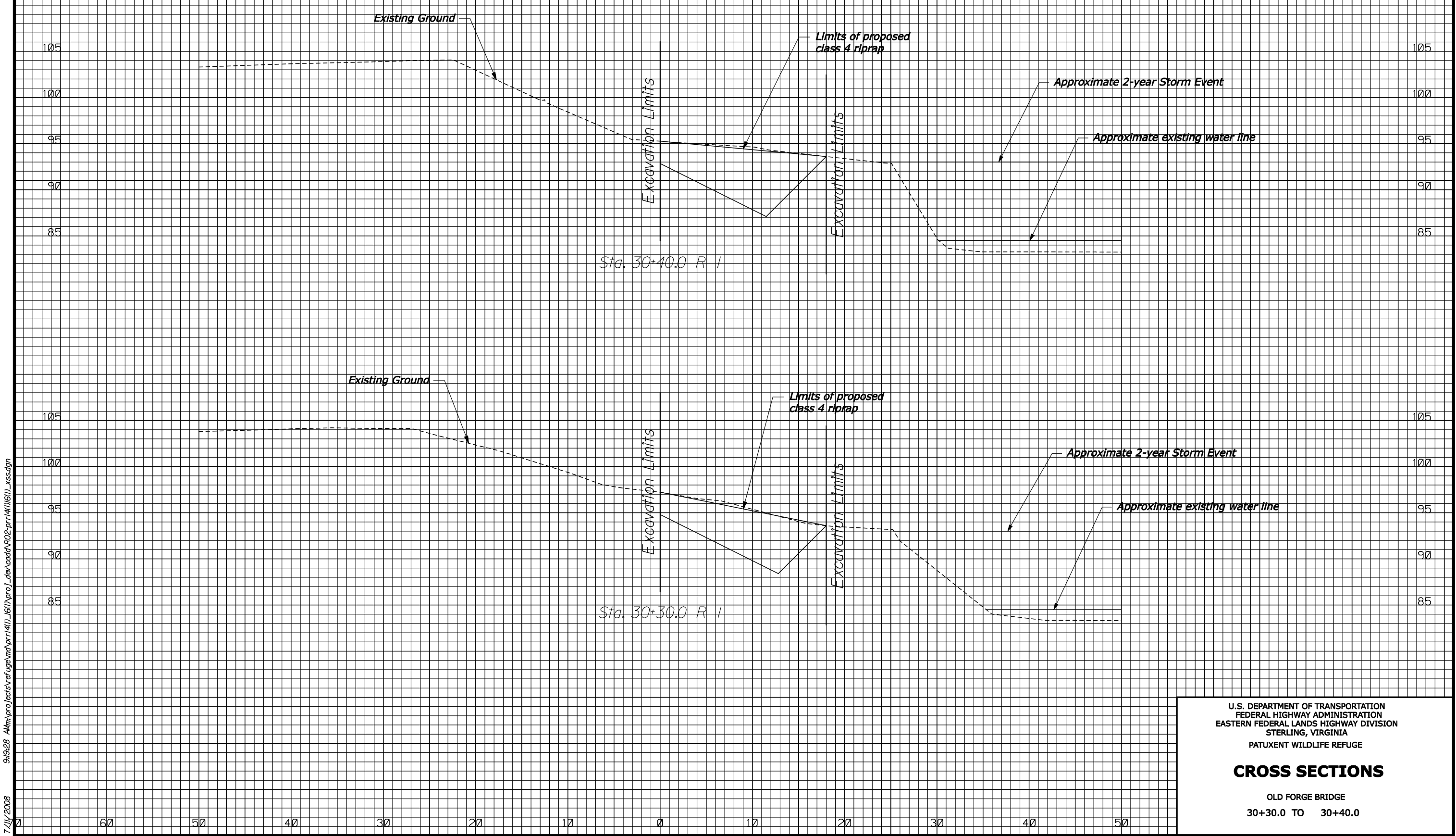
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FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION
STERLING, VIRGINIA

PATUXENT RESEARCH REFUGE

**OLD FORGE BRIDGE
TYPICAL SECTION**

NTS

REG	STATE	PROJECT	SHEET NO.
NE	MD	ERFO-PRR 14(1) 16(1)	R4



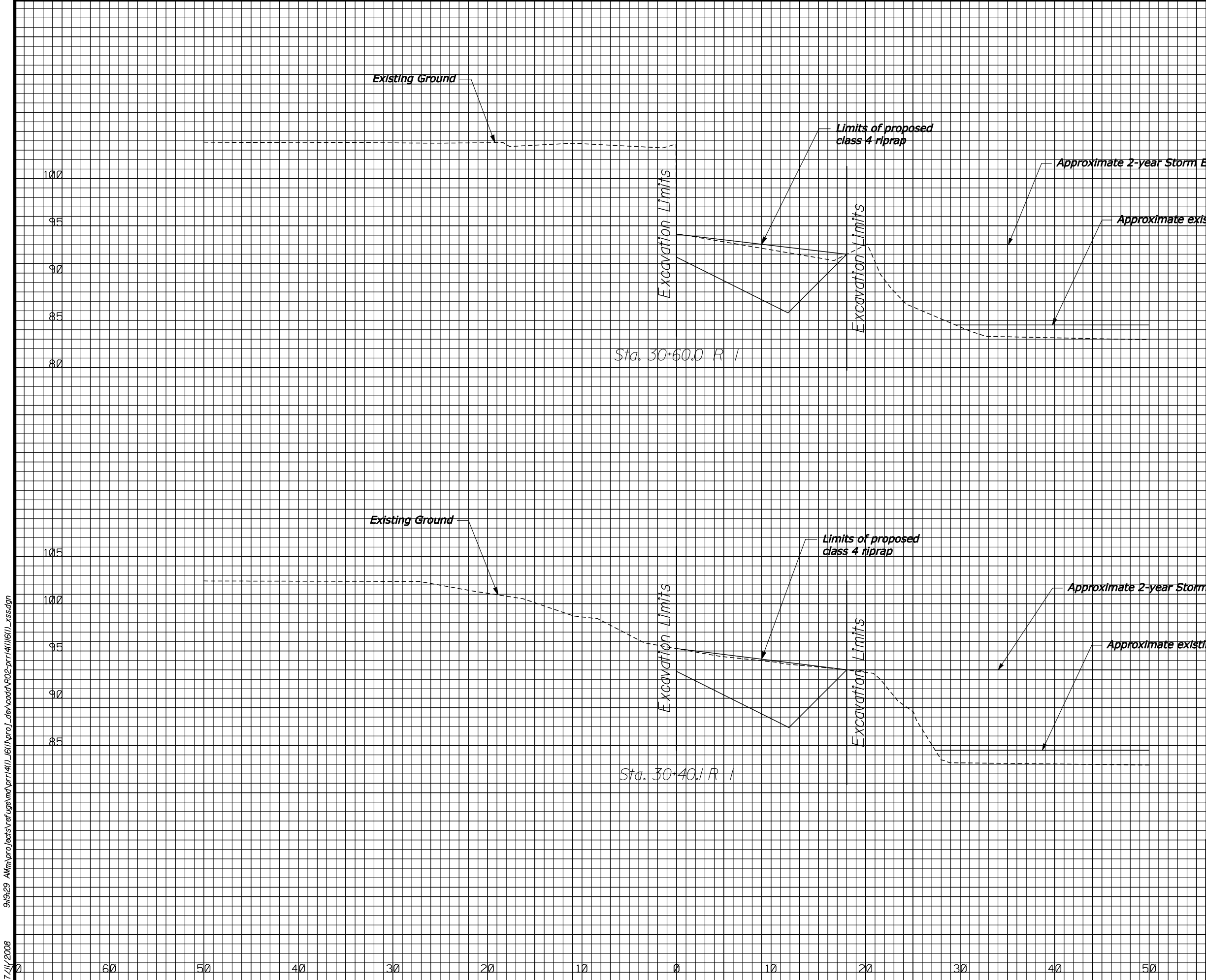
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FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION
STERLING, VIRGINIA
PATUXENT WILDLIFE REFUGE

CROSS SECTIONS

OLD FORGE BRIDGE
30+30.0 TO 30+40.0

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REG	STATE	PROJECT	SHEET NO.
NE	MD	ERFO-PRR 14(1) 16(1)	R5



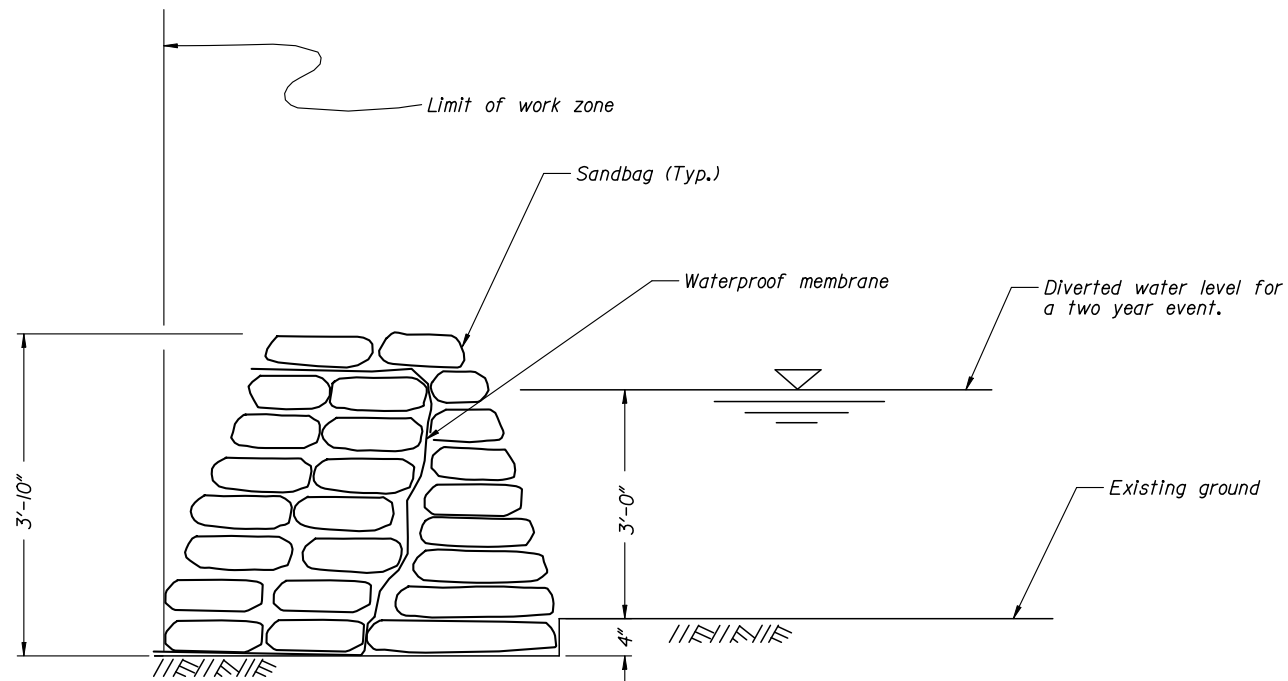
U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION
STERLING, VIRGINIA
PATUXENT WILDLIFE REFUGE

CROSS SECTIONS

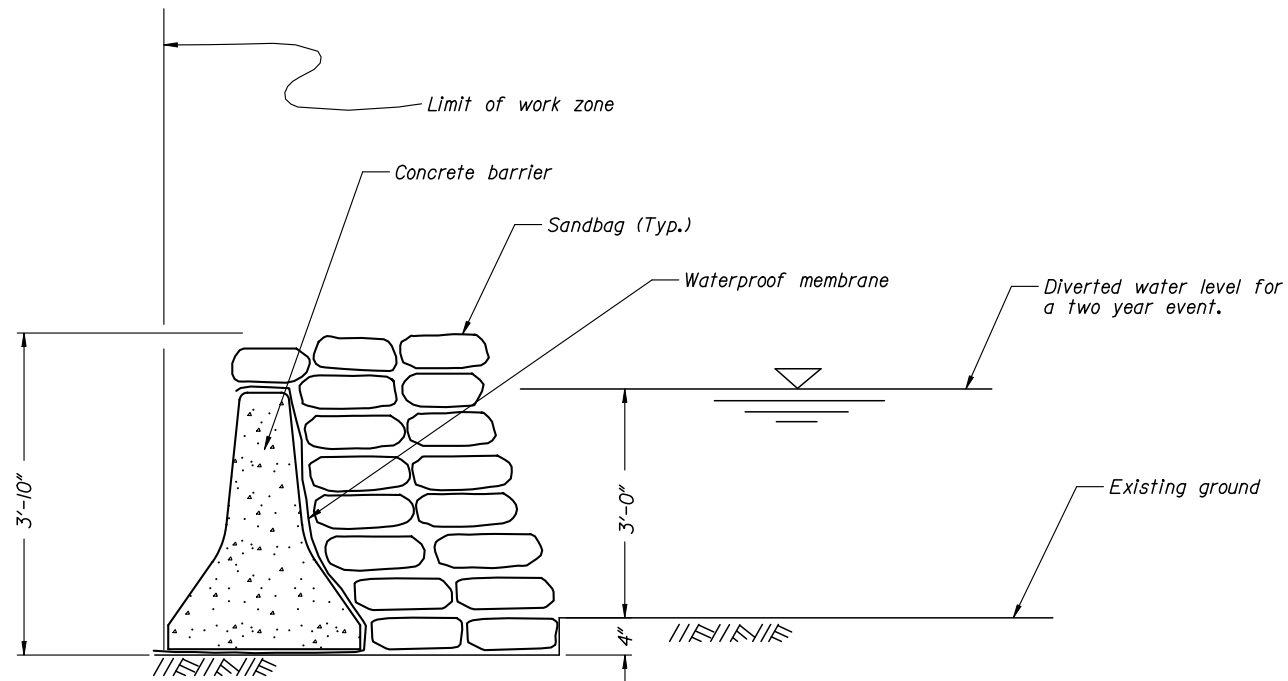
OLD FORGE BRIDGE
30+40.0 TO 30+60.0

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REG	STATE	PROJECT	SHEET NO.
NE	MD	ERF0-PRR 14(I), 16(I)	SI



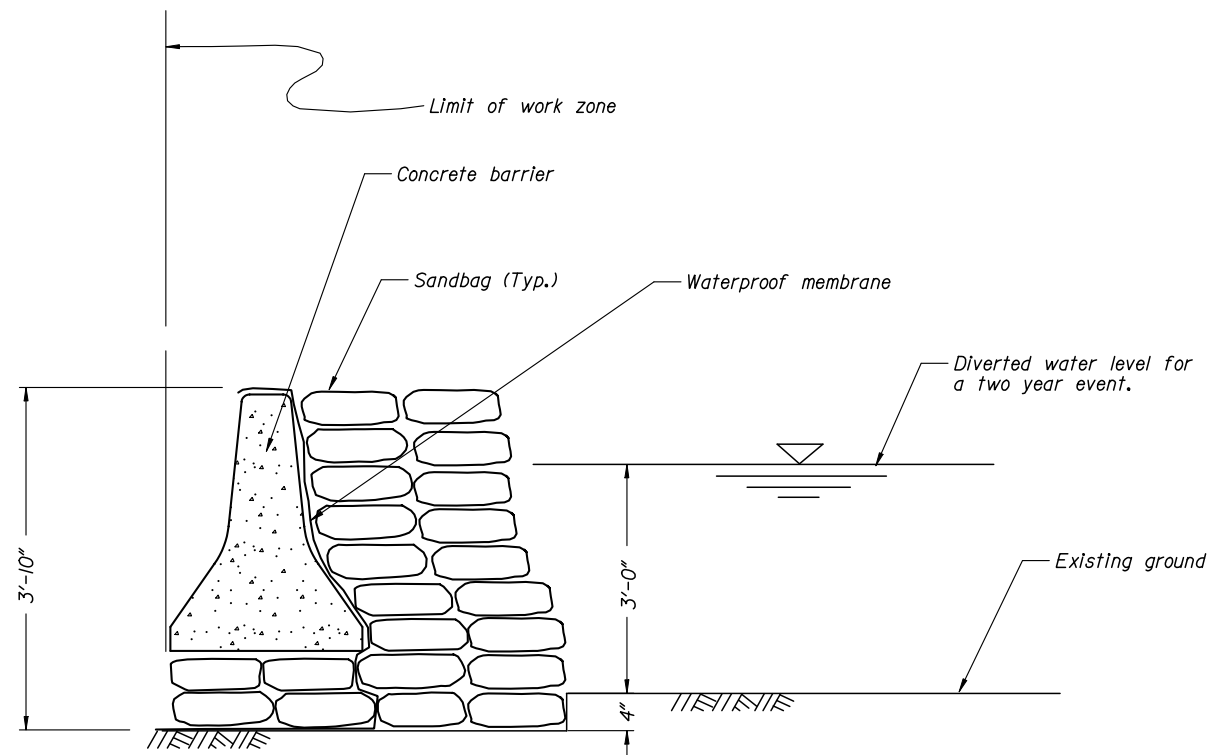
OPTION A



OPTION B

NOTES:

1. The options shown are suggested configurations for diverting the stream during construction operations. The Contractor may chose an alternate means of stream diversion. As a minimum, the Contractor must provide a temporary diversion berm with a minimum height of 6-inches above the diverted water level for a 2-year event. The 2-year flow is the flow having a 50% chance of being equaled or exceeded in a year. Submit plans for temporary stream diversion to the CO and the MDE Inspector for approval prior to installation.
2. Inspect the temporary diversion berm daily and maintain while in use; repairing as needed after rainfall events or as directed by the CO and the MDE Inspector.
3. See Special Contract Requirements, Section 157, for additional details.



OPTION C

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION

DETAIL

TEMPORARY DIVERSION BERM

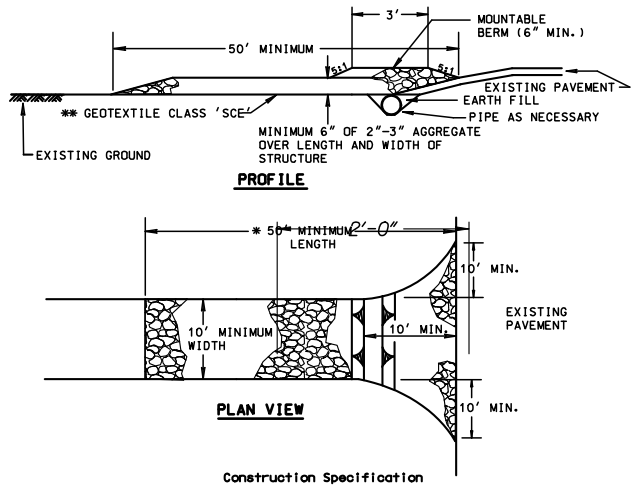
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REG	STATE	PROJECT	SHEET NO.
NE	MD	ERFO-PRR I4(I) I6(I)	S2

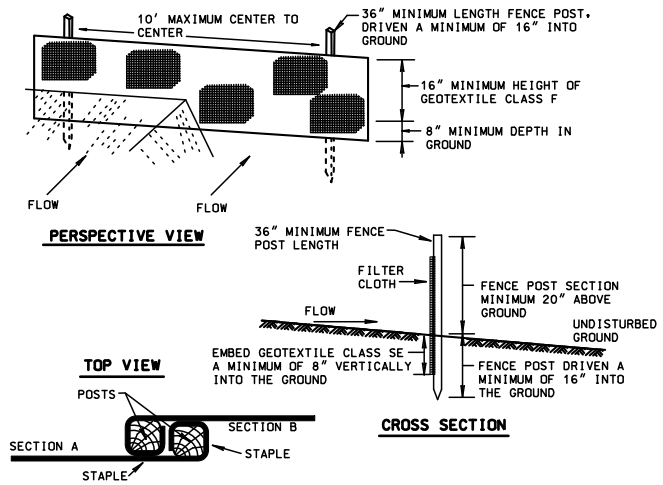
DETAIL 24 - STABILIZED CONSTRUCTION ENTRANCE



- Length - minimum of 50' (#30' for single residence lot).
- Width - 10' minimum, should be flared at the existing road to provide a turning radius.
- Geotextile fabric (filter cloth) shall be placed over the existing ground prior to placing stone. **The plan approval authority may not require single family residences to use geotextile.
- Stone - crushed aggregate (2" to 3") or reclaimed or recycled concrete equivalent shall be placed at least 6" deep over the length and width of the entrance.
- Surface Water - all surface water flowing to or diverted toward construction entrances shall be piped through the entrance, maintaining positive drainage. Pipe installed through the stabilized construction entrance shall be protected with a mountable berm with 5:1 slopes and a minimum of 6" of stone over the pipe. Pipe has to be sized according to the drainage. When the SCE is located at a high spot and has no drainage to convey a pipe will not be necessary. Pipe should be sized according to the amount of runoff to be conveyed. A 6" minimum will be required.
- Location - A stabilized construction entrance shall be located at every point where construction traffic enters or leaves a construction site. Vehicles leaving the site must travel over the entire length of the stabilized construction entrance.

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DETAIL 22 - SILT FENCE

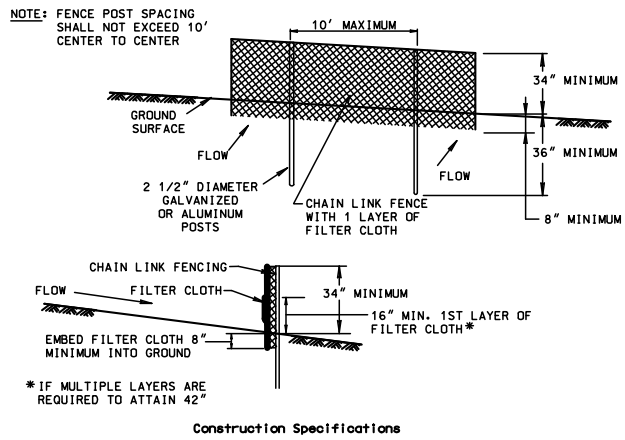


- Construction Specifications**
- Fence posts shall be a minimum of 36" long driven 16" minimum into the ground. Wood posts shall be 1 1/2" x 1 1/2" square (minimum) cut, or 1 1/2" diameter (minimum) round and shall be of sound quality hardwood. Steel posts will be standard T or U section weighting not less than 1.00 pond per linear foot.
 - Geotextile shall be fastened securely to each fence post with wire ties or staples at top and mid-section and shall meet the following requirements for Geotextile Class F:

Tensile Strength	50 lbs/in (min.)	Test: MSMT 509
Tensile Modulus	20 lbs/in (min.)	Test: MSMT 509
Flow Rate	0.3 gal /ft ² / minute (max.)	Test: MSMT 322
Filtering Efficiency	75% (min.)	Test: MSMT 322
 - Where ends of geotextile fabric come together, they shall be overlapped, folded and stapled to prevent sediment bypass.
 - Silt Fence shall be inspected after each rainfall event and maintained when bulges occur or when sediment accumulation reached 50% of the fabric height.

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DETAIL 33 - SUPER SILT FENCE



- Construction Specifications**
- Fencing shall be 42" in height and constructed in accordance with the latest Maryland State Highway Details for Chain Link Fencing. The specification for a 6' fence shall be used, substituting 42" fabric and 6' length posts.
 - Chain link fence shall be fastened securely to the fence posts with wire ties. The lower tension wire, brace and truss rods, drive rods, and post caps are not required except on the ends of the fence.
 - Filter cloth shall be fastened securely to the chain link fence with ties spaced every 24" at the top and mid section.
 - Filter cloth shall be embedded a minimum of 8" into the ground.
 - When two sections of filter cloth adjoin each other, they shall be overlapped by 6" and folded.
 - Maintenance shall be performed as needed and silt buildups removed when "bulges" develop in the silt fence, or when silt reaches 50% of fence height
 - Filter cloth shall be fastened securely to each fence post with wire ties or staples at top and mid section and shall meet the following requirements for Geotextile Class F:

Tensile Strength	50 lbs/in (min.)	Test: MSMT 509
Tensile Modulus	20 lbs/in (min.)	Test: MSMT 509
Flow Rate	0.3 gal /ft ² / minute (max.)	Test: MSMT 322
Filtering Efficiency	75% (min.)	Test: MSMT 322

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SUPER SILT FENCE

Design Criteria

Slope	Slope Steepness	Slope Length (maximum)	Silt Fence Length (maximum)
0 - 10%	0 - 10:1	Unlimited	Unlimited
10 - 20%	10:1 - 5:1	200 feet	1,500 feet
20 - 33%	5:1 - 3:1	100 feet	1,000 feet
33 - 50%	3:1 - 2:1	100 feet	500 feet
50% +	2:1 +	50 feet	250 feet

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SILT FENCE

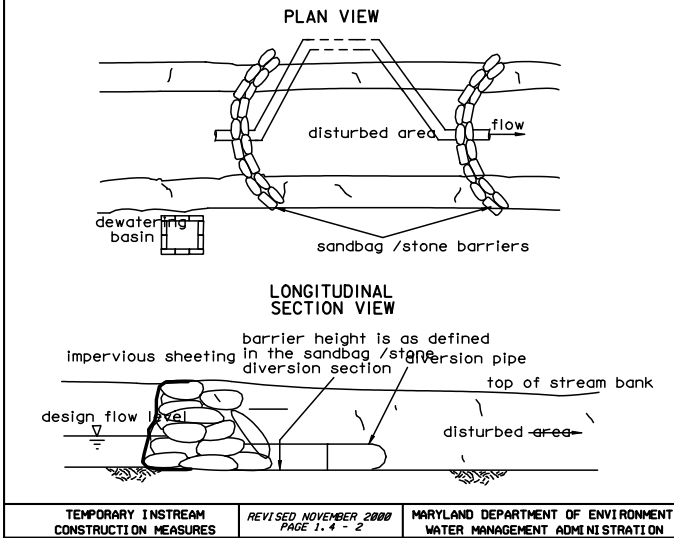
Silt Fence Design Criteria

Slope Steepness	(Maximum) Slope Length	(Maximum) Silt Fence Length
Flatter than 50:1	unlimited	unlimited
50:1 to 10:1	125 feet	1,000 feet
10:1 to 5:1	100 feet	750 feet
5:1 to 3:1	60 feet	500 feet
3:1 to 2:1	40 feet	250 feet
2:1 and steeper	20 feet	125 feet

Note: In areas of less than 2% slope and sandy soils (USDA general classification system, soil Class A) maximum slope length and silt fence length will be unlimited. In these areas a silt fence may be the only perimeter control required.

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DETAIL I.4: DIVERSION PIPE



MGWC I.4: DIVERSION PIPE

Temporary measure for dewatering in-channel construction sites

DESCRIPTION

The work should consist of installing flow diversion pipes in combination with sandbag or stone diversions when construction activities occur within the stream channel.

EFFECTIVE USES & LIMITATIONS

Diversion pipes with an insufficient flow capacity can cause the channel diversion to fail thereby resulting in severe erosion of the disturbed channel section under construction. Therefore, in-channel construction activities should occur only during periods of low flow.

MATERIAL SPECIFICATIONS

Materials for stream diversions should meet the following requirements:

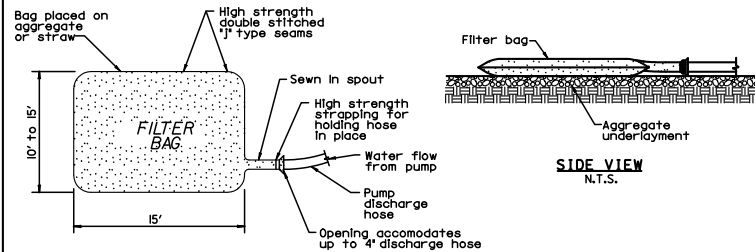
- Riprap: Stone should be washed and have a minimum diameter of 6 inches (15 centimeters).
- Sandbags: Sandbags should consist of materials which are resistant to ultra-violet radiation, tearing, and puncture and should be woven tightly enough to prevent leakage of fill material (i.e., sand, fine gravel, etc.).
- Sheetpiling: Sheetpiling should consist of polyethylene or other material which is impervious and resistant to puncture and tearing.

INSTALLATION GUIDELINES

All erosion and sediment control devices including mandatory dewatering basins should be installed as the first order of business according to a plan approved by the WMA or local authority. Installation should proceed from upstream to downstream during low flow conditions. If necessary, silt fence or straw bales should be installed around the perimeter of the work area.

Diversion pipes with sandbag or stone barriers should be completed as follows (refer to Detail I.4):

- Sandbag/stone barriers should be sized and installed as detailed in MGWC I.5; Sandbag/stone Diversion. The materials should be sized to withstand base flow velocities.
- All excavated material should be deposited and stabilized in an approved area outside the 100-year floodplain unless otherwise authorized by the WMA.
- Sediment laden water from the construction area should be pumped to a dewatering basin.
- The diversion pipe should have a minimum capacity sufficient to convey the 2-year flow for projects with a duration of two weeks or greater. For projects of shorter duration, the capacity of the pipe can be reduced accordingly.
- If necessary, silt fence or straw bales should be installed around the perimeter of the work area.



FILTER BAG (OR APPROVED EQUAL) DETAIL

FILTER BAG NOTES:

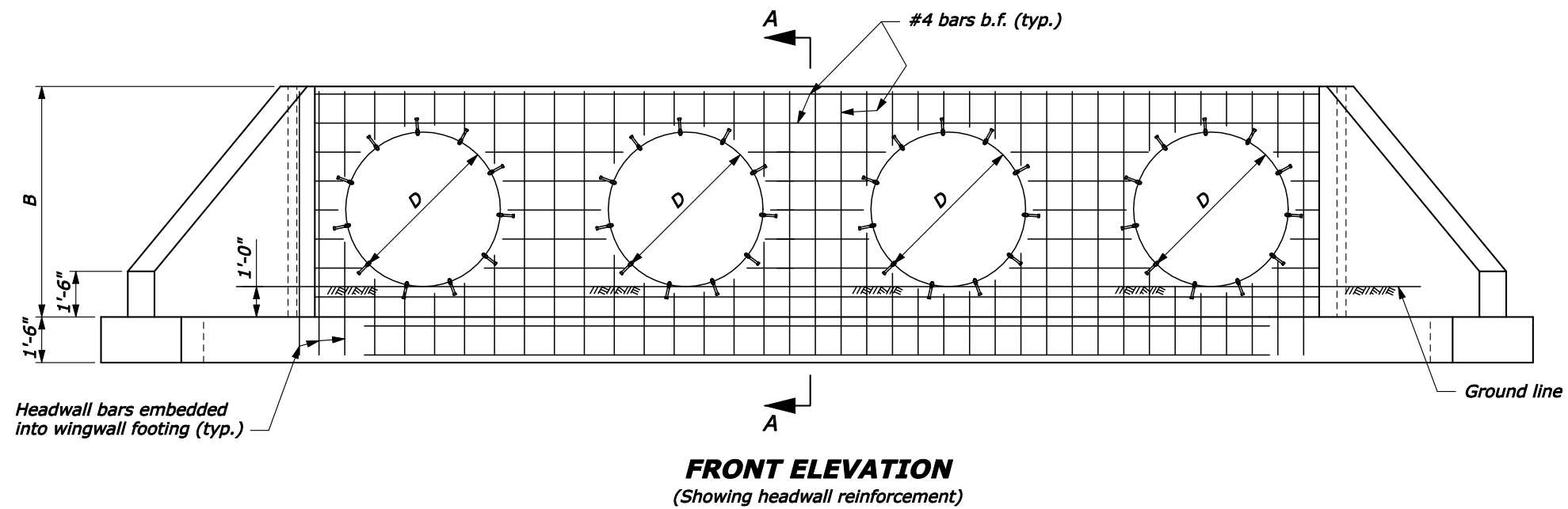
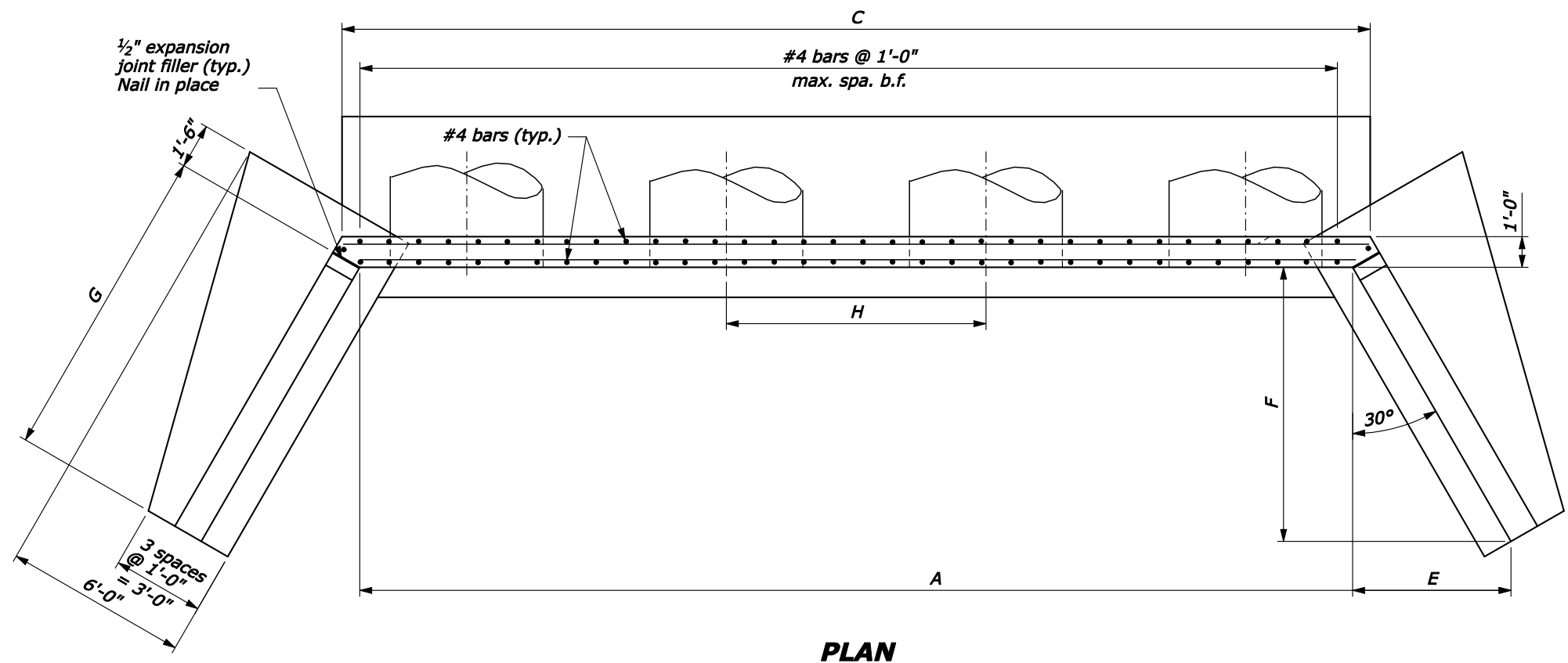
- Filter bag shall have a nozzle large enough to accommodate a four (4) inch diameter pump discharge hose.
- Nozzle shall be sealed tightly around the pump discharge hose with a strap or similar device to prevent unfiltered water from escaping.
- The geotextile fabric shall meet the minimum requirements with properties determined in accordance with the Sub section 714.03 of the Special Contract Requirements (SCR).
- Construction specifications are in subsection 157.10 of the Special Contract Requirements (SCR).

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION

DETAIL
MARYLAND DEPARTMENT OF THE ENVIRONMENT
EROSION CONTROL
DETAILS

DETAIL APPROVED FOR USE XX/XX	DETAIL
REVISED: XX/XX	EI57-B

REG	STATE	PROJECT	SHEET NO.
NE	MD	ERFO-PRR 14(1) 16(1)	S4



Sheet 1 of 2

U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION FEDERAL LANDS HIGHWAY	
U.S. CUSTOMARY DETAIL CONCRETE HEADWALL/WINGWALL FOR QUADRUPLE NORMAL 36" PIPE CULVERT	
STANDARD APPROVED FOR USE 6/2005 REVISED:	DETAIL 601-A

NO SCALE

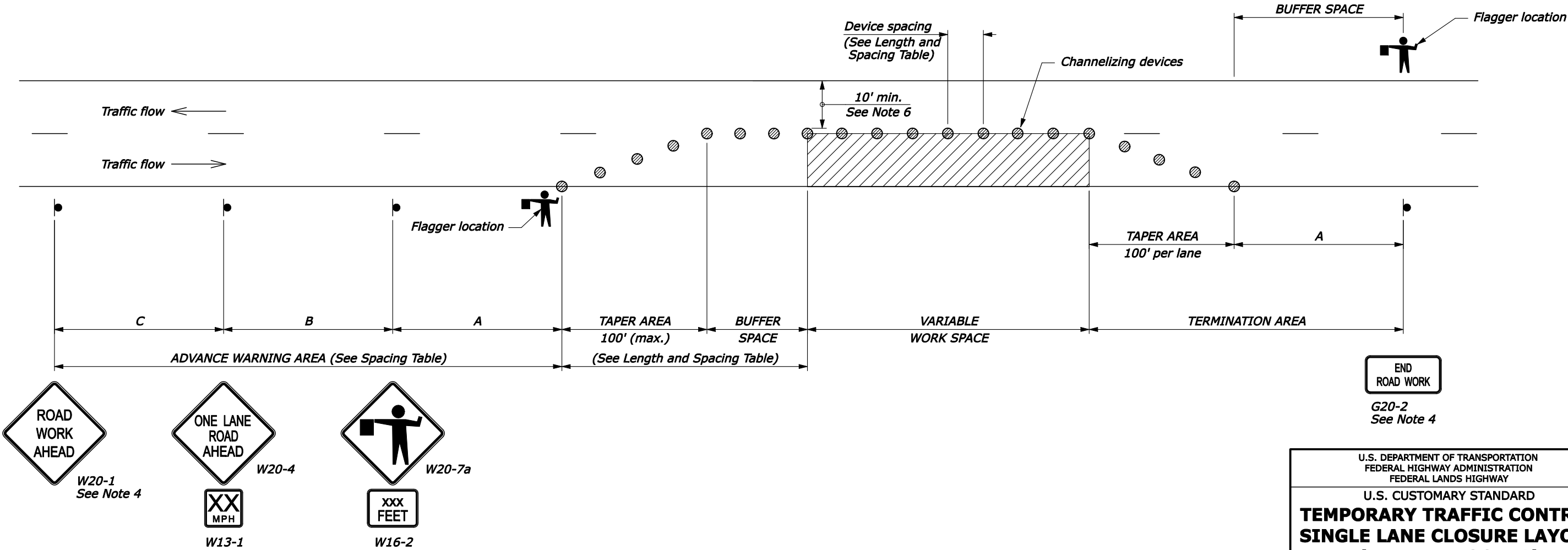
LENGTH AND SPACING TABLE				
APPROACH SPEED*	LENGTH OF BUFFER SPACE	CHANNELIZING DEVICE		
		TAPER AREA	BUFFER SPACE	WORK SPACE
MPH	FEET	SPACING IN FEET		
25	155	20	50	50
30	200	20	60	60
35	250	20	70	70
40	305	20	80	80
45	360	20	90	90
50	425	20	100	100
55	495	20	110	110

* Approach speed based on the regulatory posted speed, not the advisory speed.

SIGN SPACING TABLE			
ROAD TYPE	DISTANCE BETWEEN SIGNS IN FEET		
	A	B	C
Urban 40 MPH and less	100	100	100
Urban 45 MPH and greater	350	350	350
Rural	500	500	500
Expressway/Freeway	1000	1500	2640

NOTE:

1. Signs are shown for one direction of travel only. Place devices similar to those depicted for the opposite direction of travel.
2. Final location and spacing of signs and devices may be changed to fit field conditions as approved by the CO.
3. For pilot car operation, mount the PILOT CAR FOLLOW ME (G20-4) sign at a conspicuous location on the rear of vehicle. Prominently display the name of the contractor on the pilot car.
4. If closure is completely within the project limits, eliminate the "ROAD WORK AHEAD" (W20-1) and "END ROAD WORK" (G20-2) signs.
5. For night time flagging operation, provide floodlighting at flagger stations.
6. For project specific minimum width, refer to Special Contract Requirements, Section 156.
7. Do not allow equipment, materials, or vehicles to be parked or stored in the buffer space.
8. If signs will be in place more than 72 consecutive hours, use ground-mounted post.



REG	STATE	PROJECT	SHEET NO.
NE	MD	ERFO-PRR 14(1) 16(1)	T1



U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION
STERLING, VIRGINIA
PATUXENT RESEARCH REFUGE

CROSS SECTIONS

ROUTE 15 WILDLIFE LOOP ROAD
20+00.0 TO 21+00.0

REG	STATE	PROJECT	SHEET NO.
NE	MD	ERFO-PRR 14(1) 16(1)	T2

